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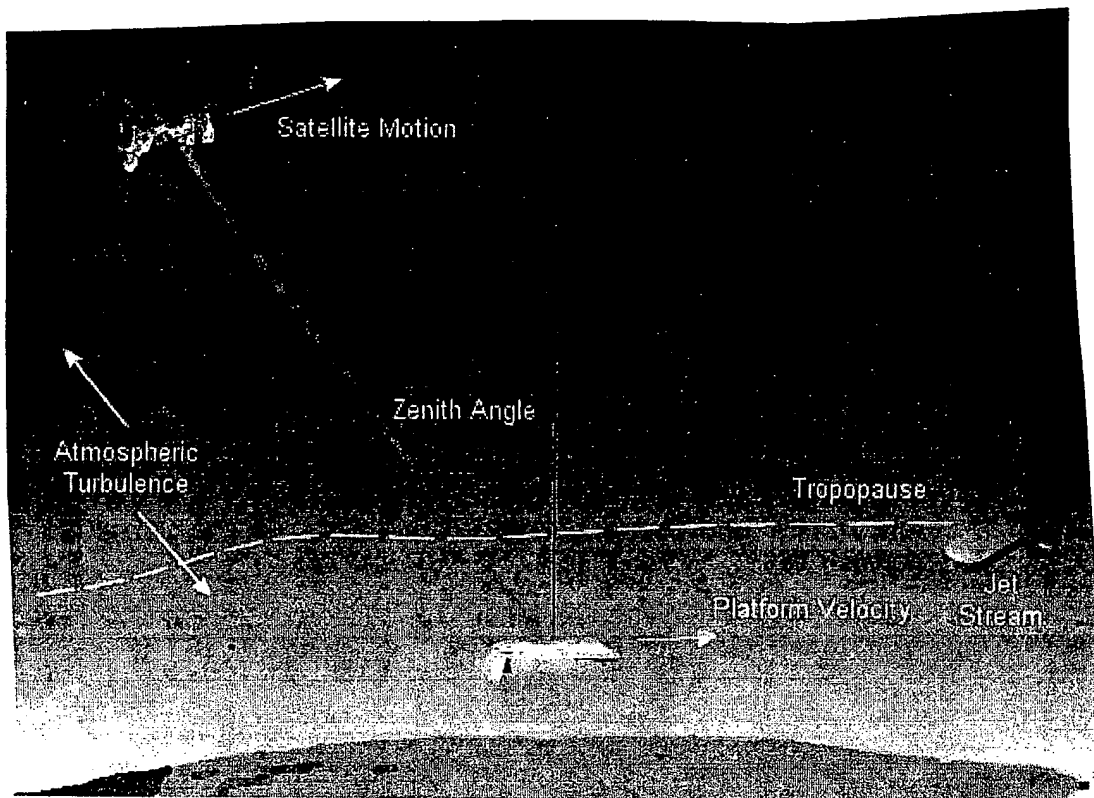
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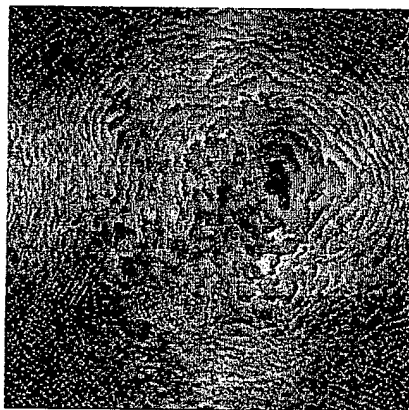
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Platform Parameters

FIG 1A



Phase Map through Turbulence

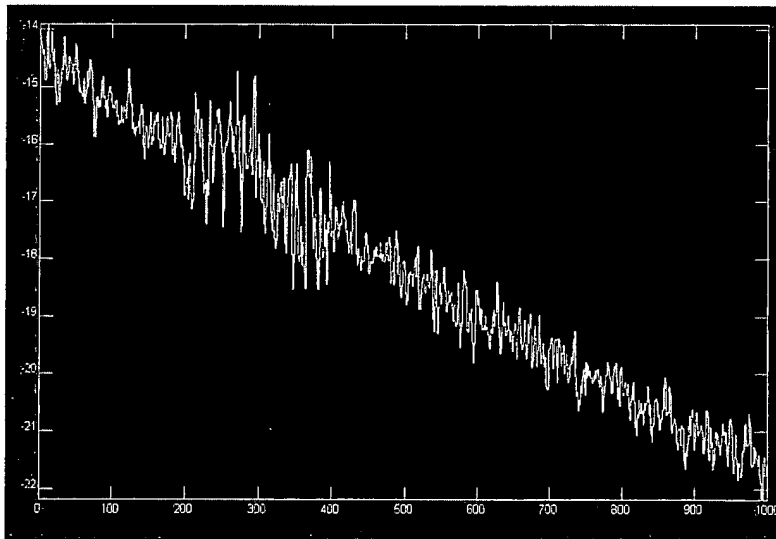
FIG 1B

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Time Sequence of Beam Distribution at Satellite  
(bar represents 10m at 1000km)

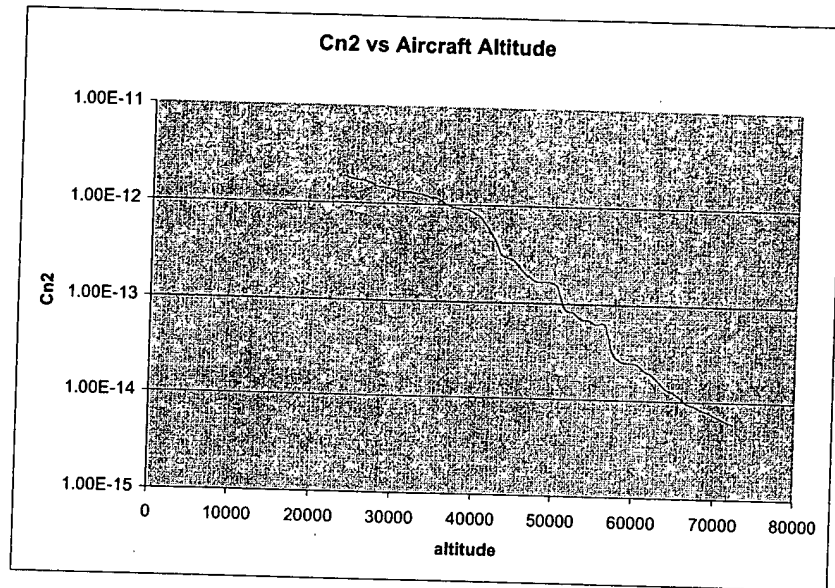
FIG. 1C



Simulated  $C_n^2$  profile.

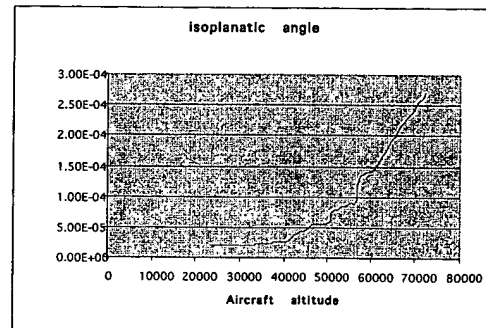
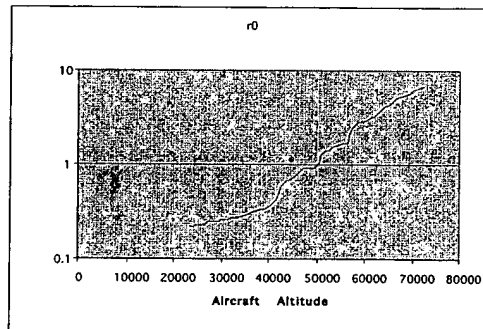
FIG. 1D

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Integrated  $C_n^4$  versus aircraft altitude in feet

FIG 1E



Atmospheric coherence parameters versus aircraft altitude

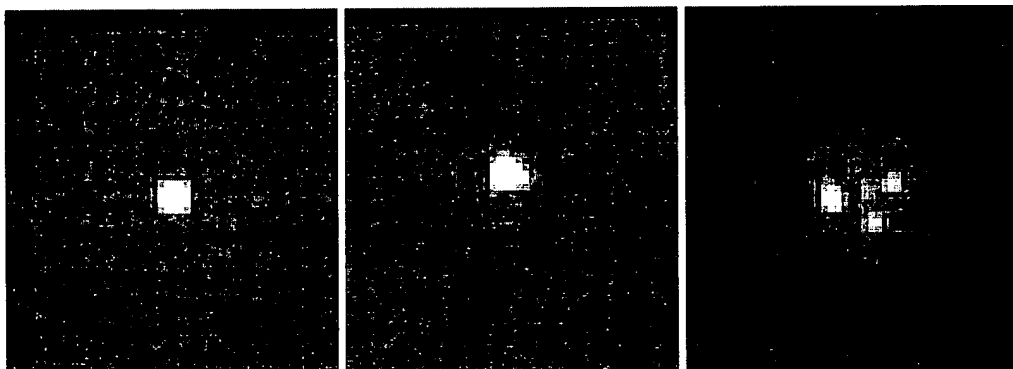
FIG. 1F1

FIG 1F2



Simulated turbulence induced phase error

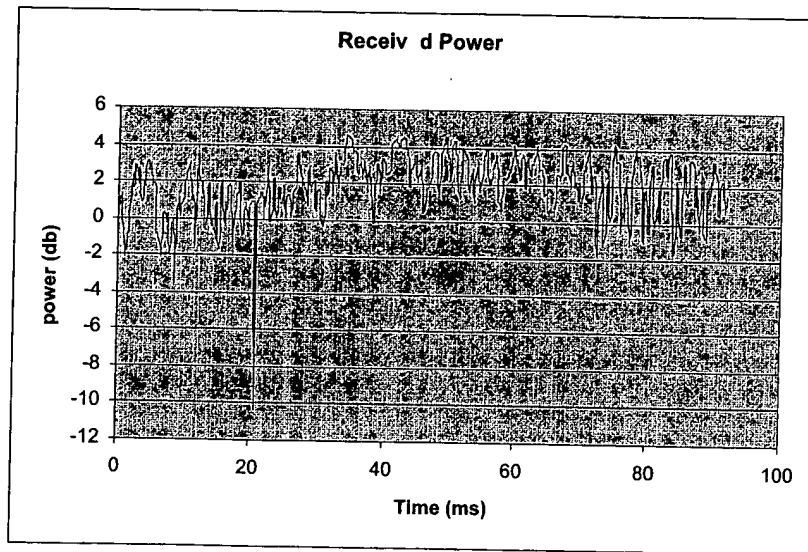
FIG. 1G



Diffraction limited beam profile (left) and typical beam profiles at satellite

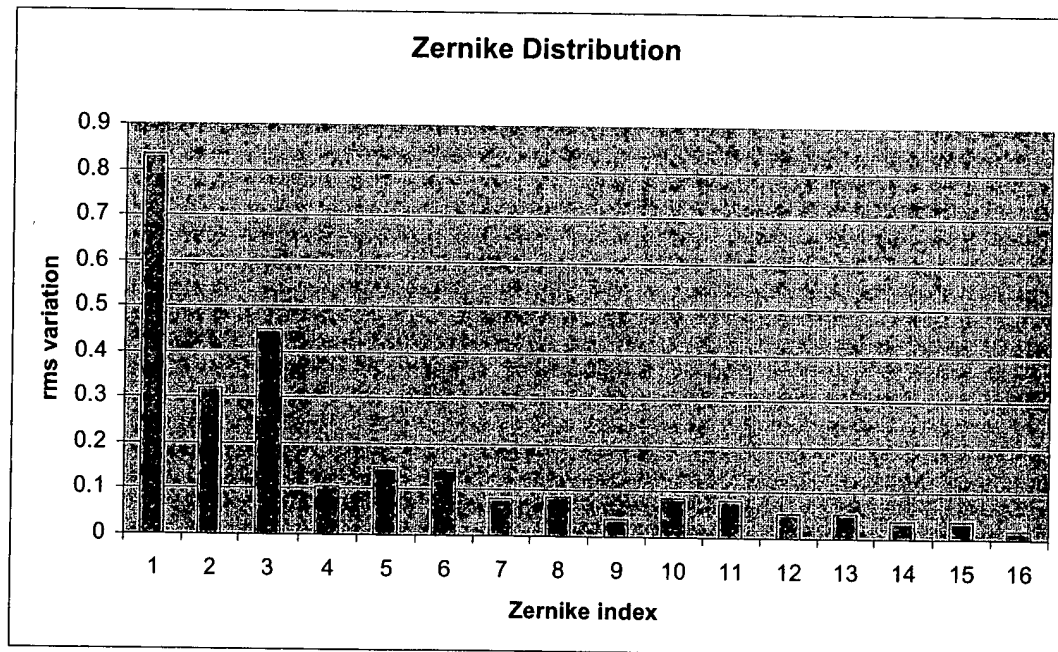
FIG. 1H

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Time Series of Received Power

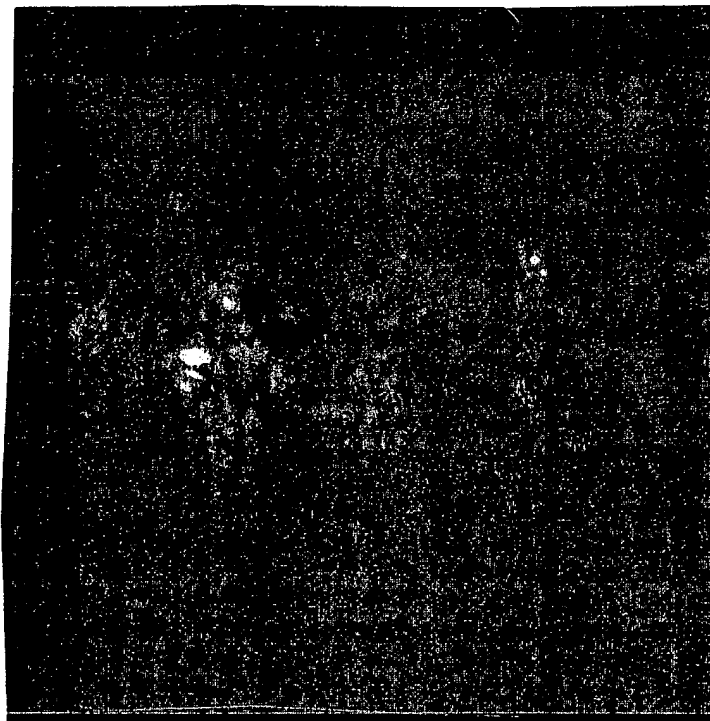
FIG. 1I



Temporal Variation in Lowest 15 Zernike terms

FIG. 1J

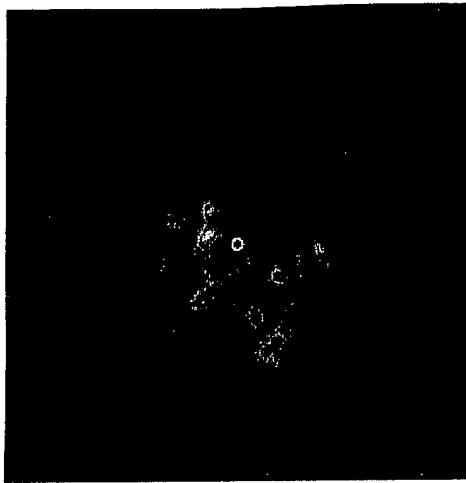
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Intensity distribution at receiver aperture

FIG. 1K

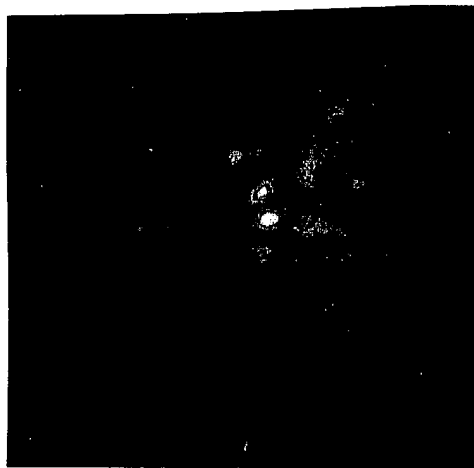
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Laser Beam  
Speckle  
Image

Spot during a deep fade event

FIG. 1M



Typical calculated spot at detector plane

FIG. 1L



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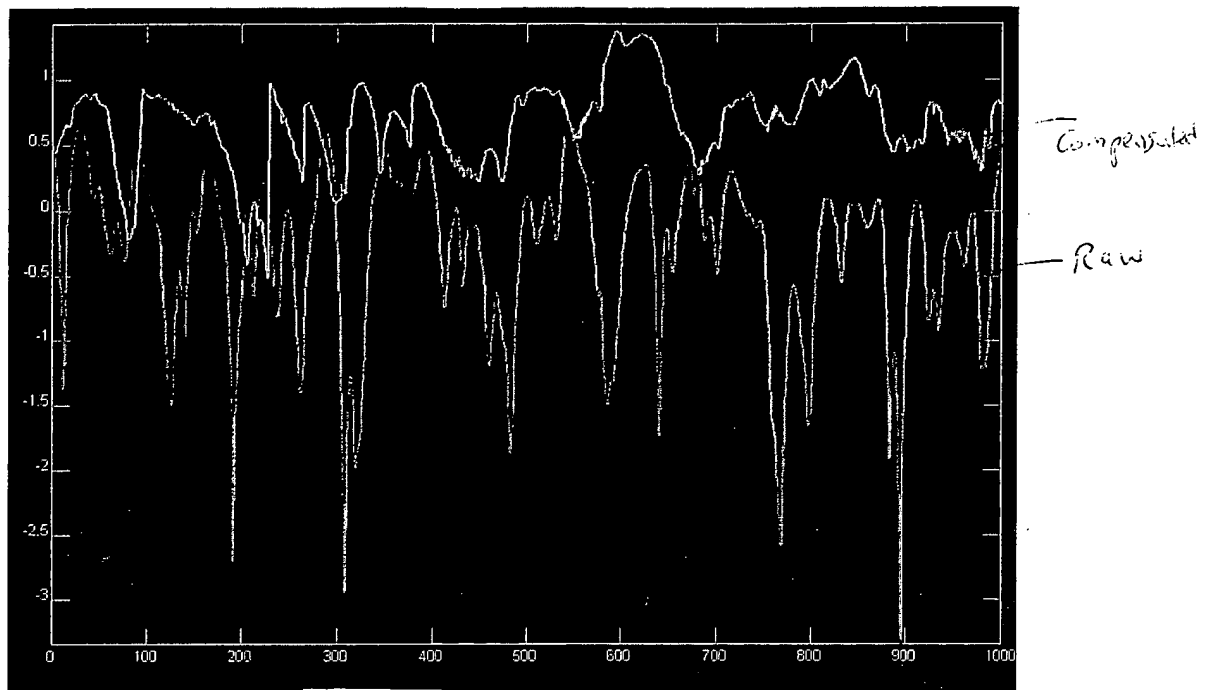


FIG 1N

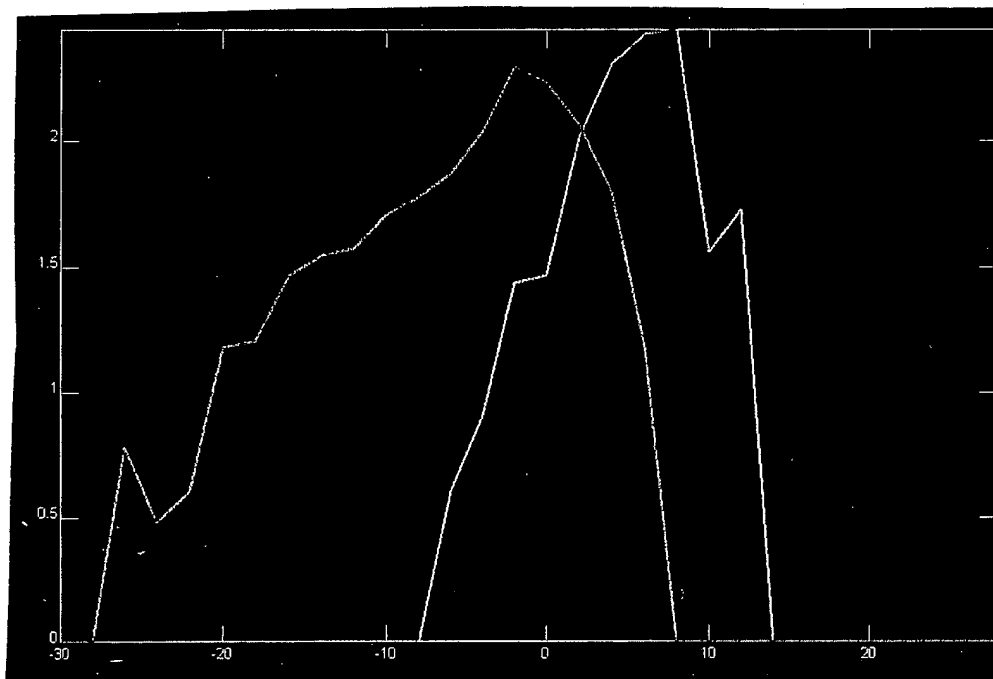


FIG 10

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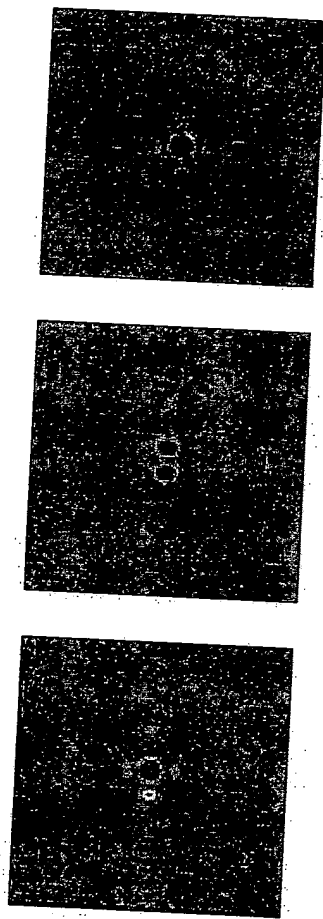


Figure 6  
Blur spots formed by aperture with 0.2, 0.5, and 1.0 wave phase steps.

FIG 1P

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Modulation of a speckle pattern by a phase step .

FIG 1Q

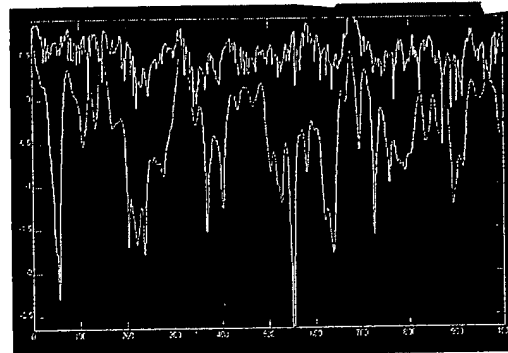
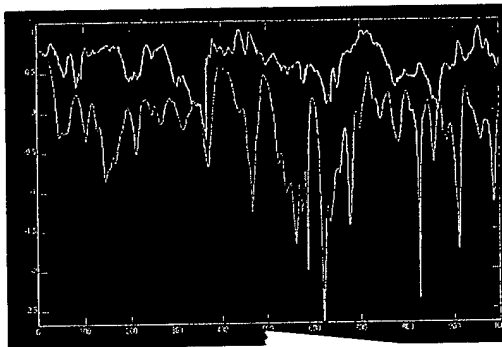
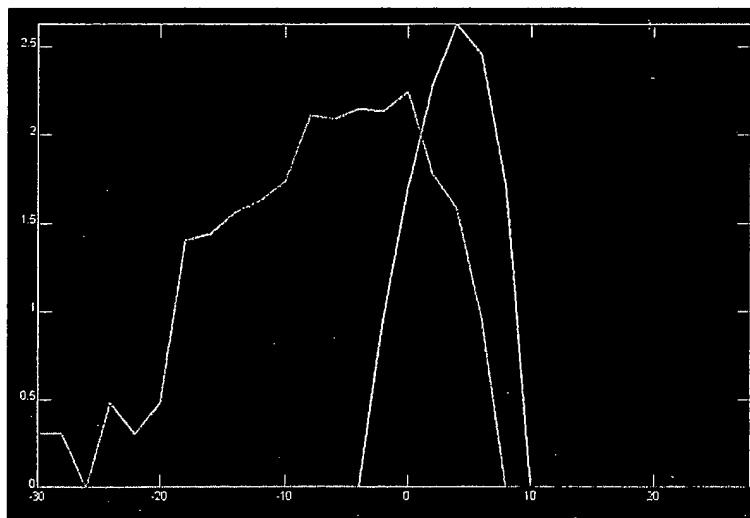


FIG. 1R1

FIG 1R2

Log intensity vs. iteration number.  
Top, 2X2 phase modulator; bottom, 4X4 phase modulator.

T



PDF for the data in FIG 9K2

FIG 1S

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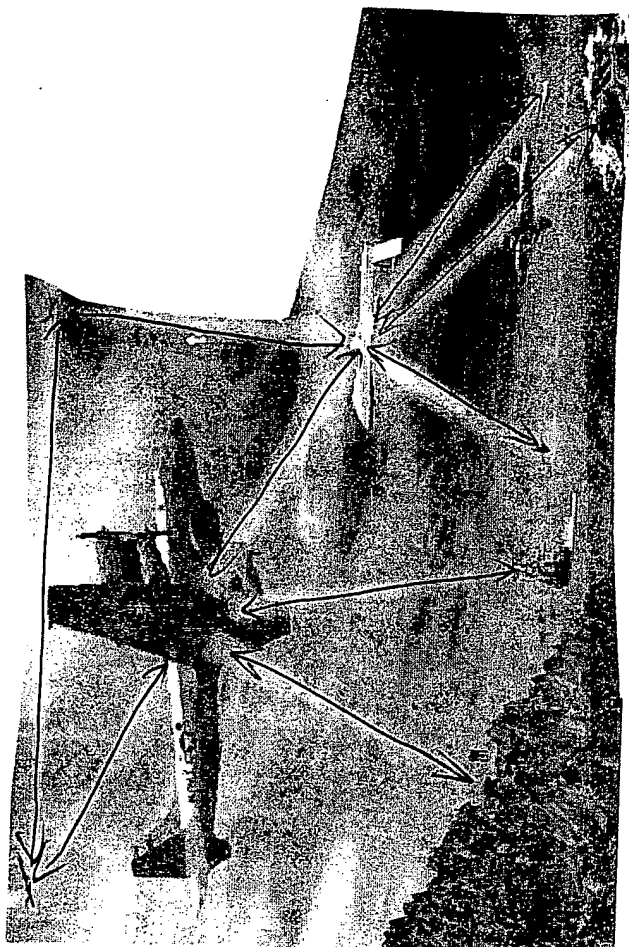


FIG 2A

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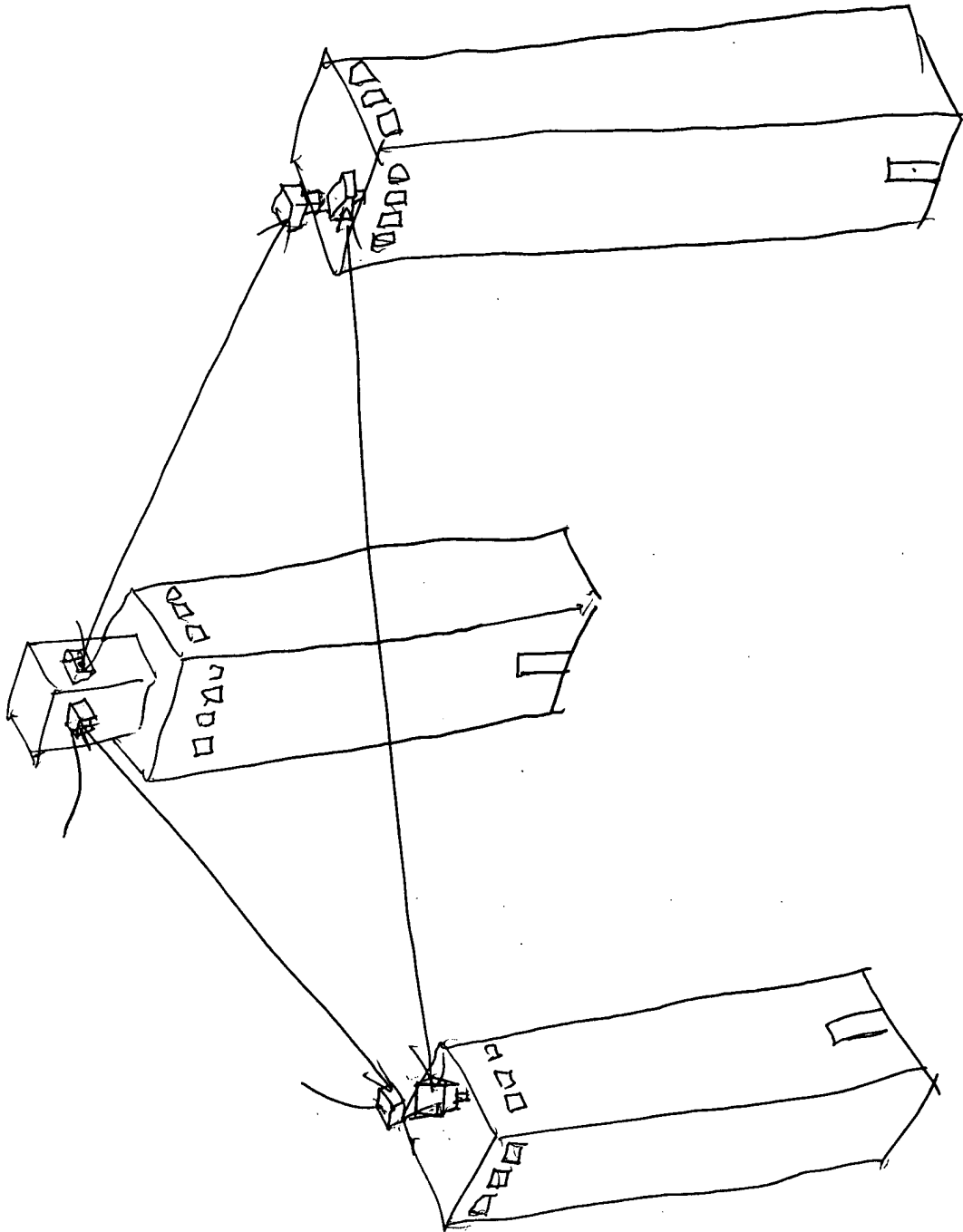
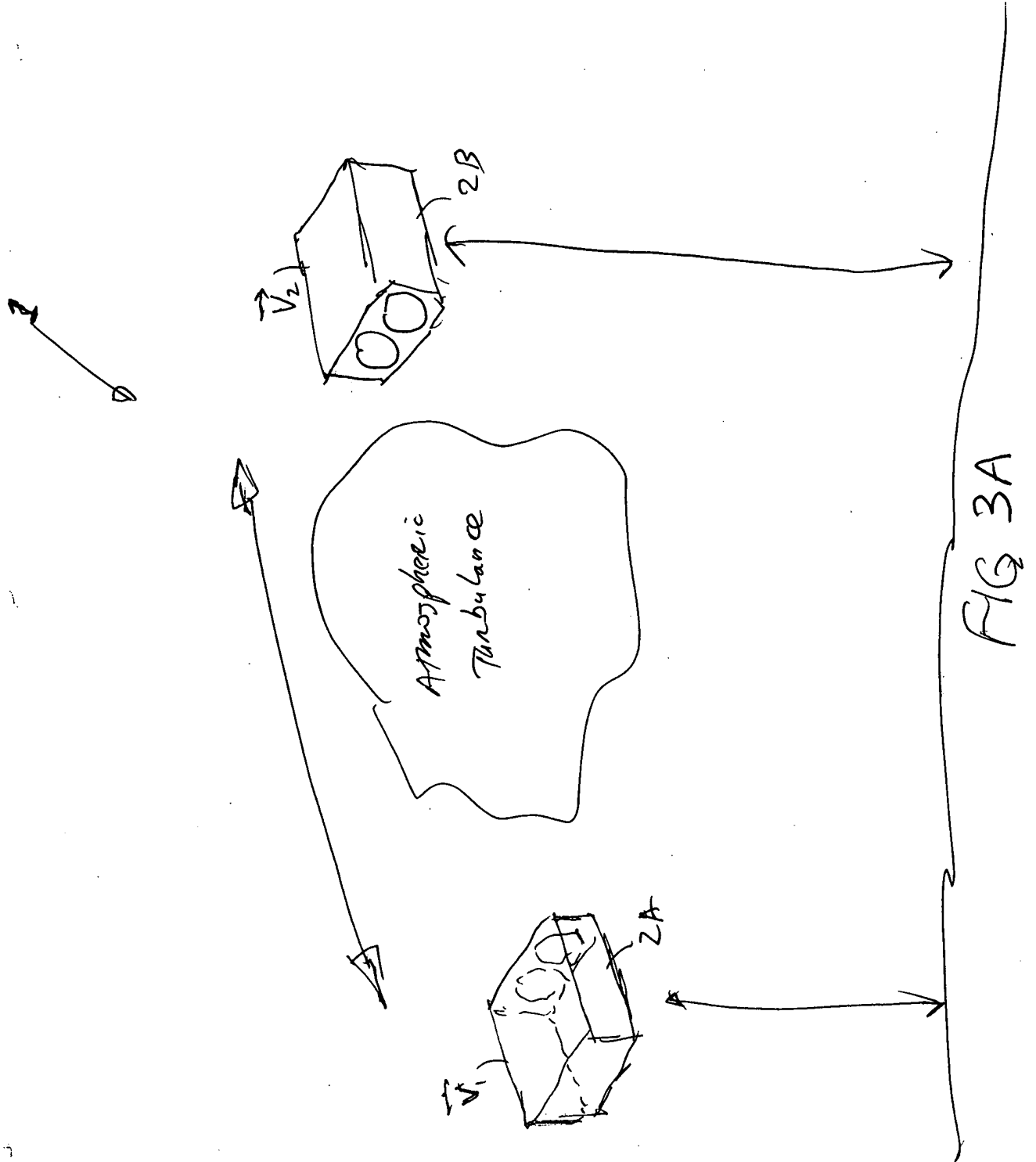


FIG. 2B

City Environment  
Building - Building

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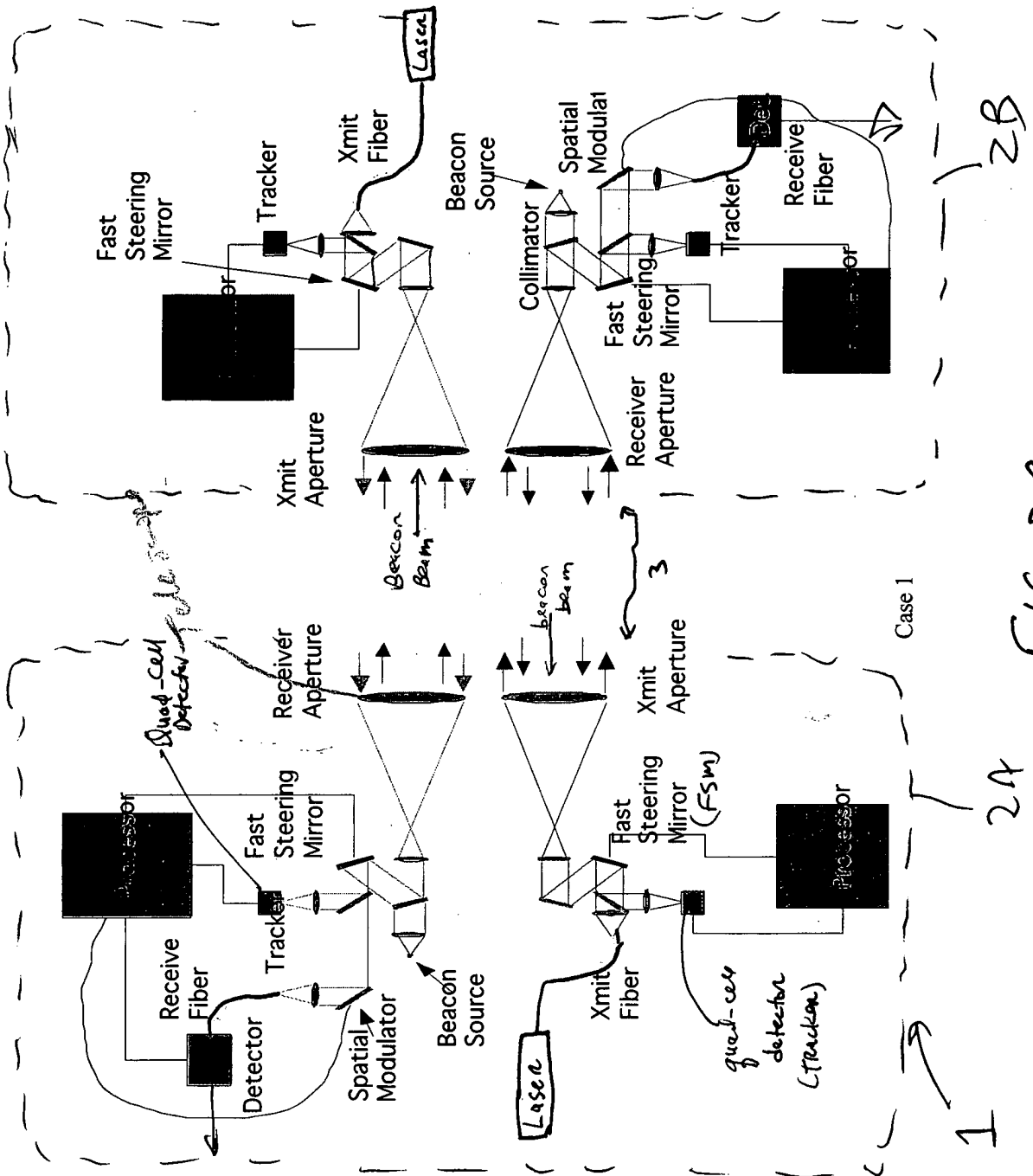
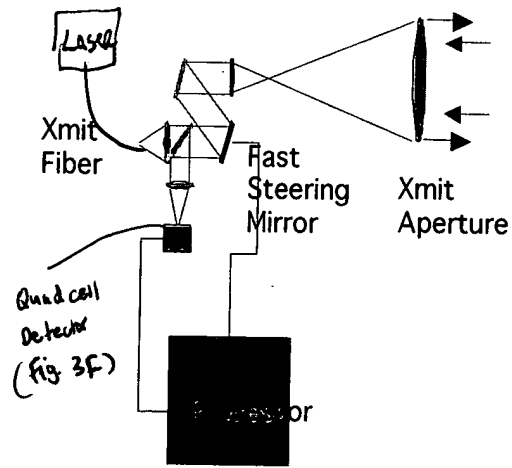


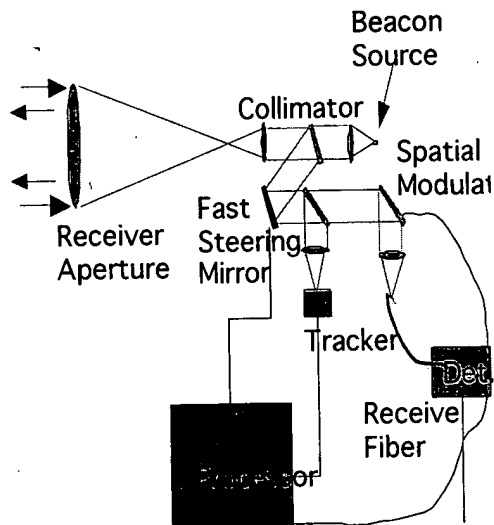
FIG. 3B

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← 4

FIG. 3C

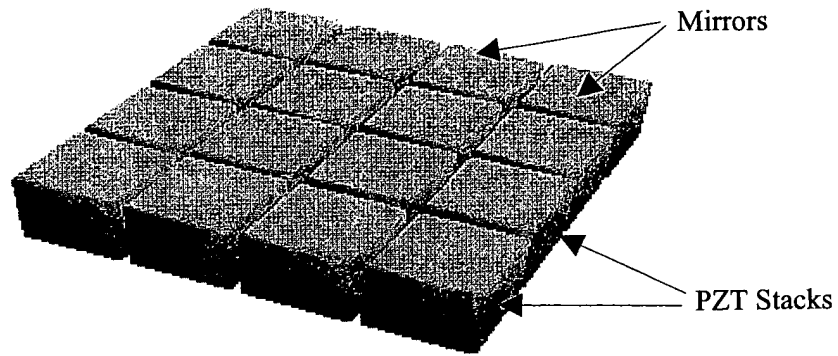


← 5

FIG. 3D



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Phase Modulator

FIG. 3E

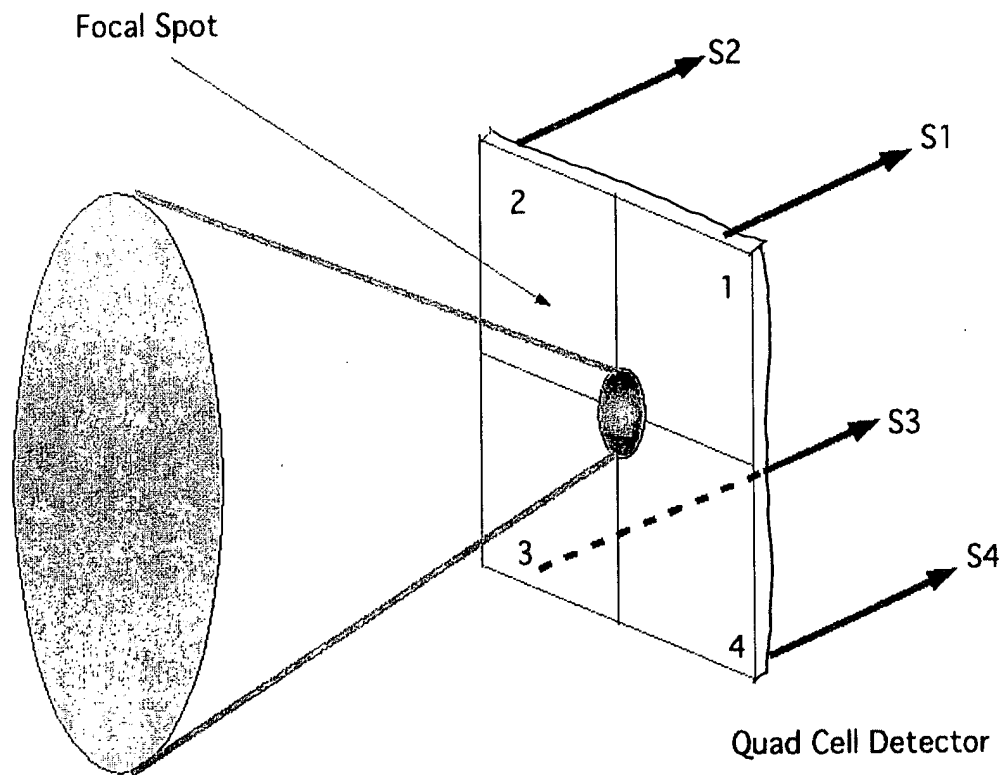
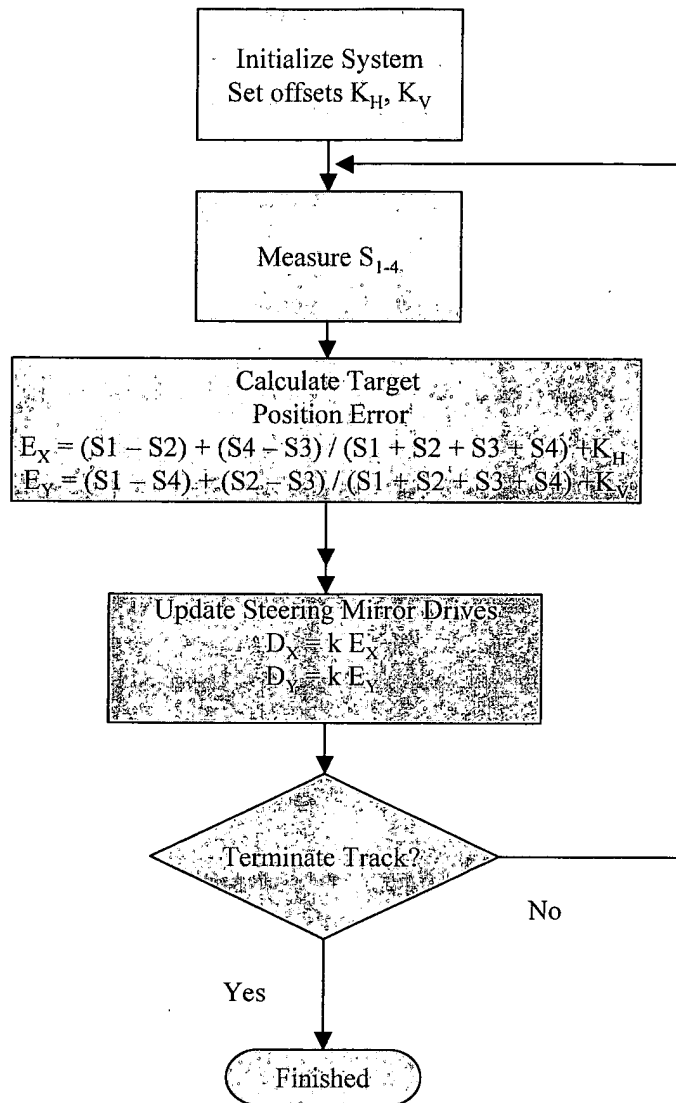


FIG. 3F

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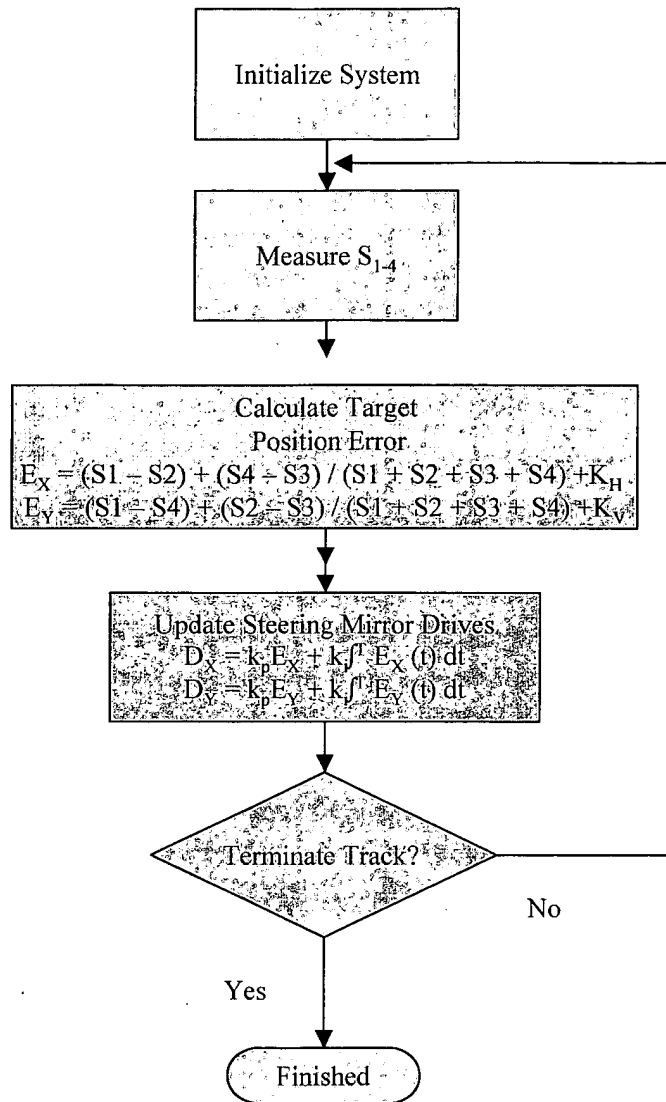


Proportional Control

Transmitter

FIG. 4A

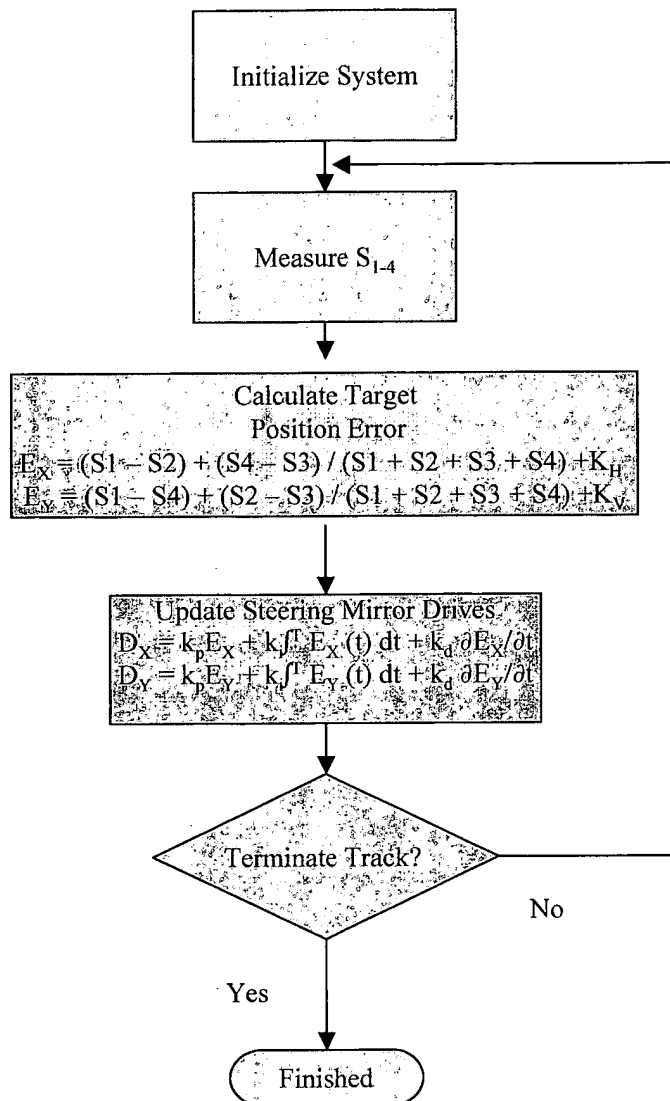
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Proportional plus Integral Control

FIG. 4B

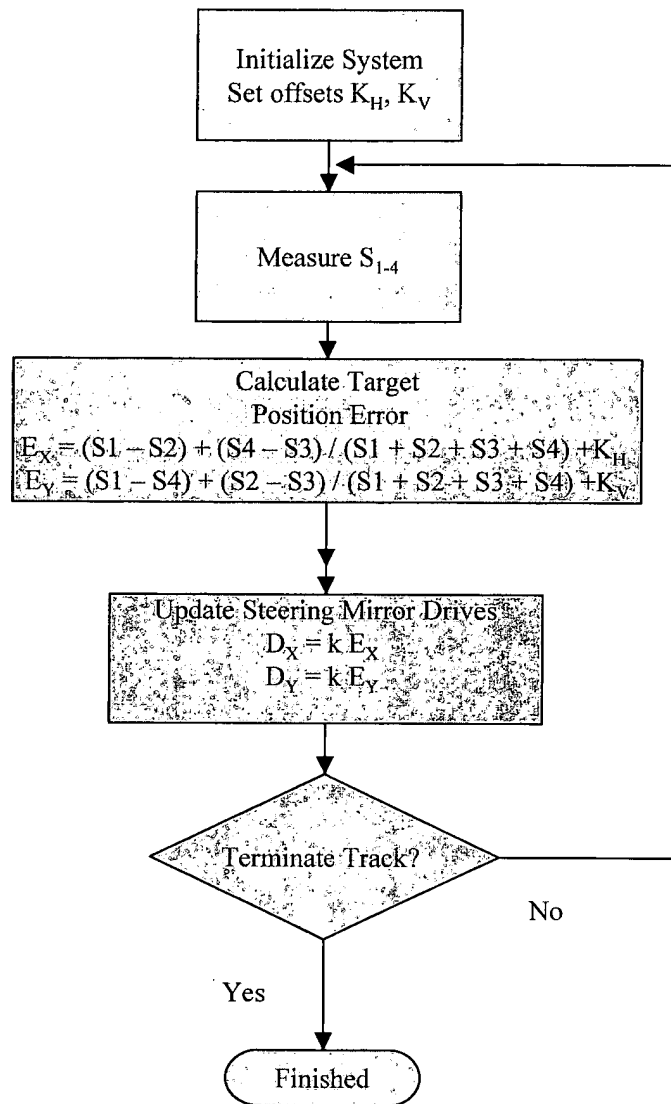
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Proportional plus Integral Control plus Derivative

FIG. 4C

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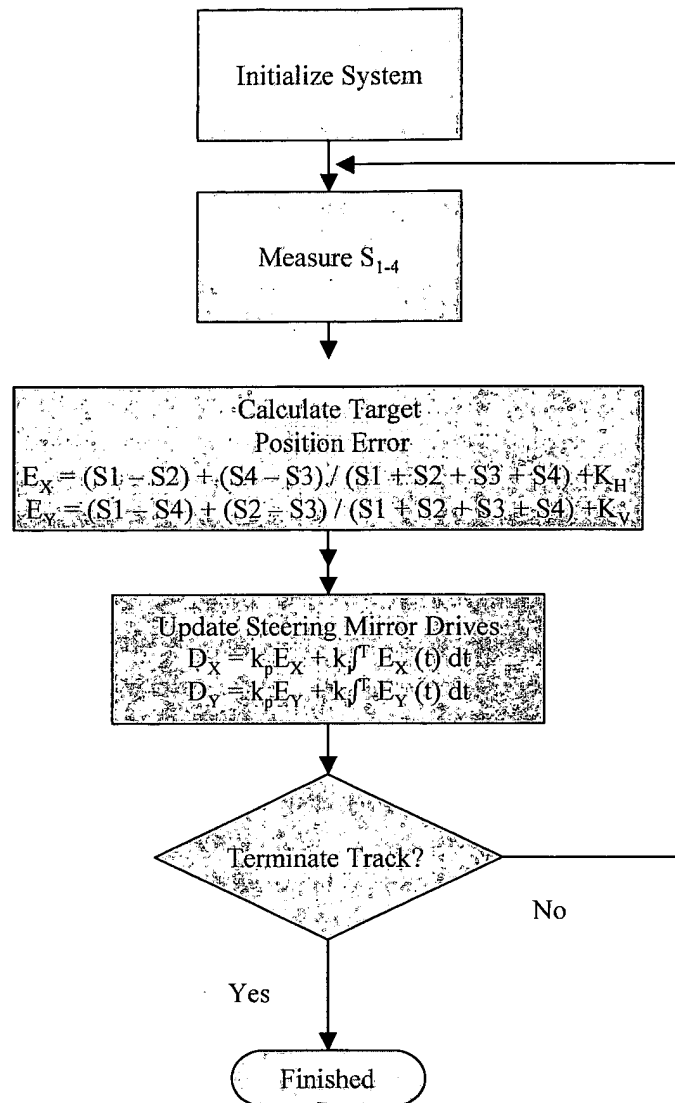


Proportional Control

Received

FIG. 4D

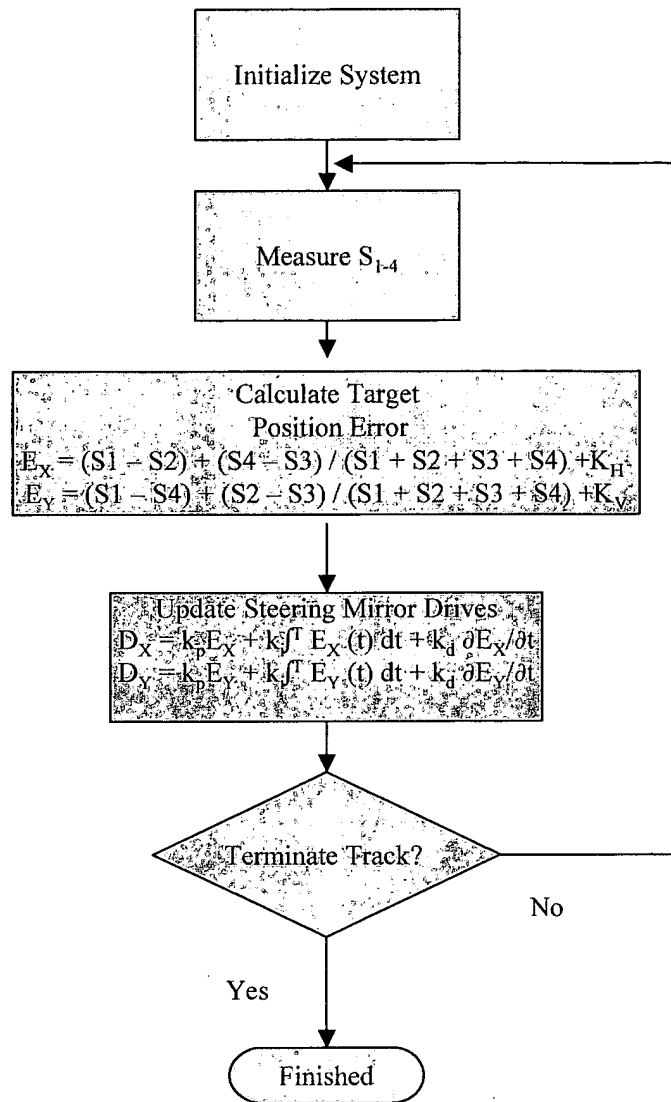
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Proportional plus Integral Control

FIG. 4E

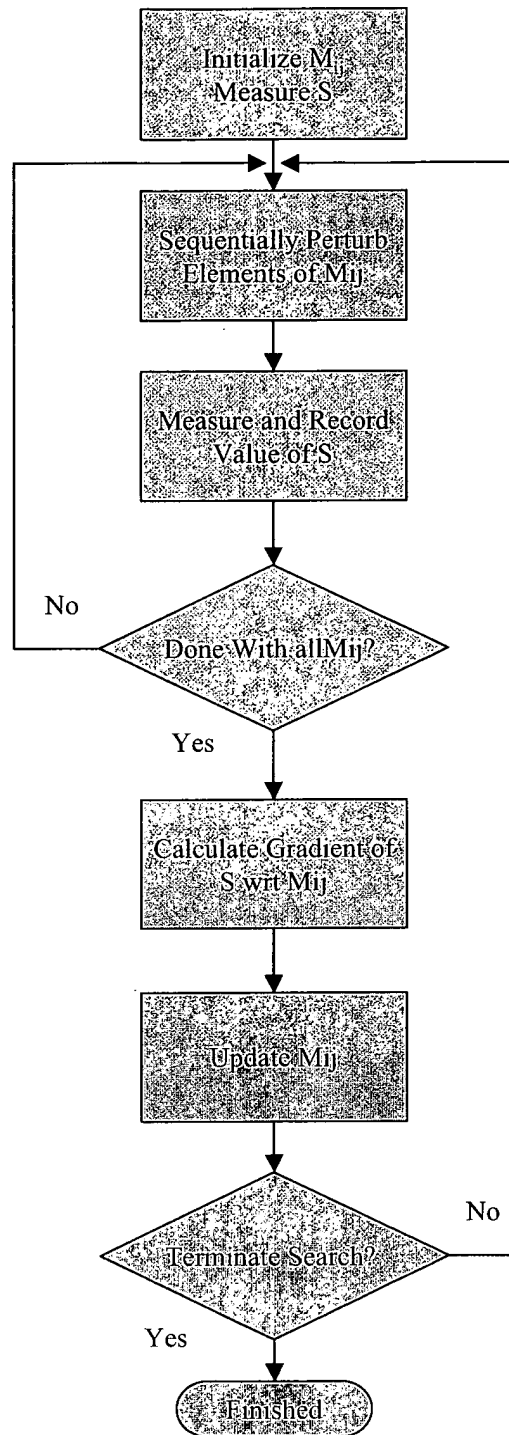
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Proportional plus Integral Control plus Derivative

FIG. 4F

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SPM Control  
Signal Generation  
Algorithm

FIG 5A



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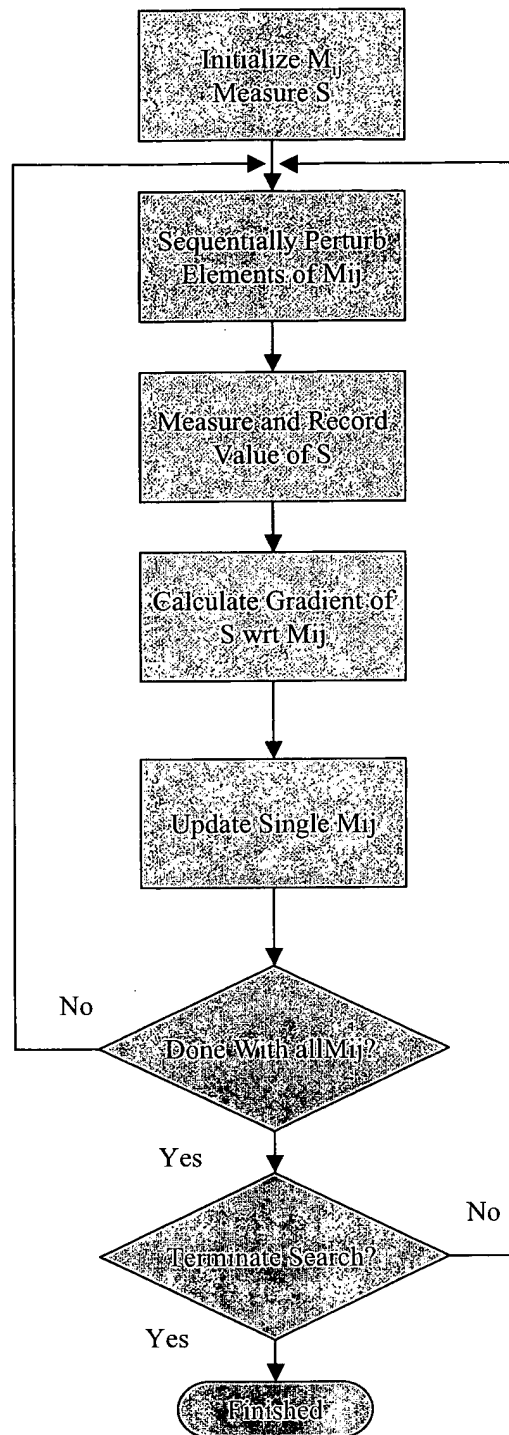


FIG 5B

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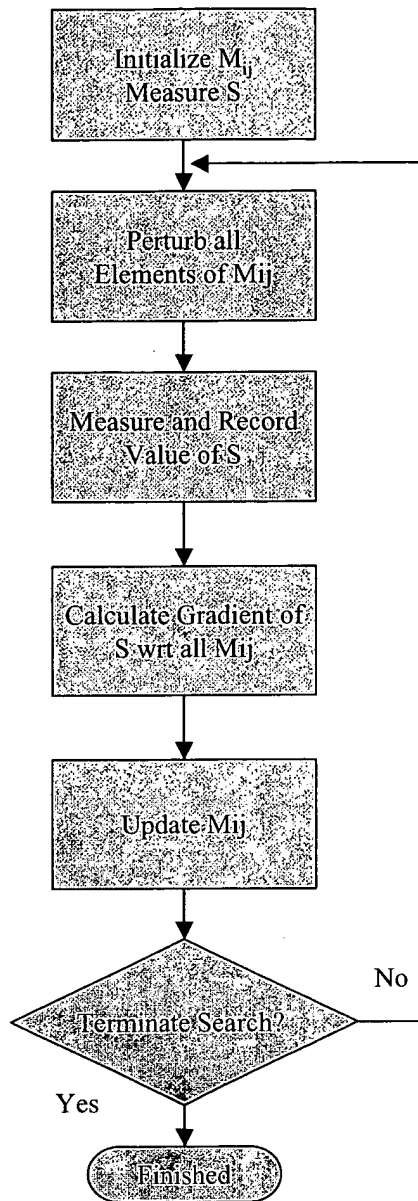


FIG. 5C

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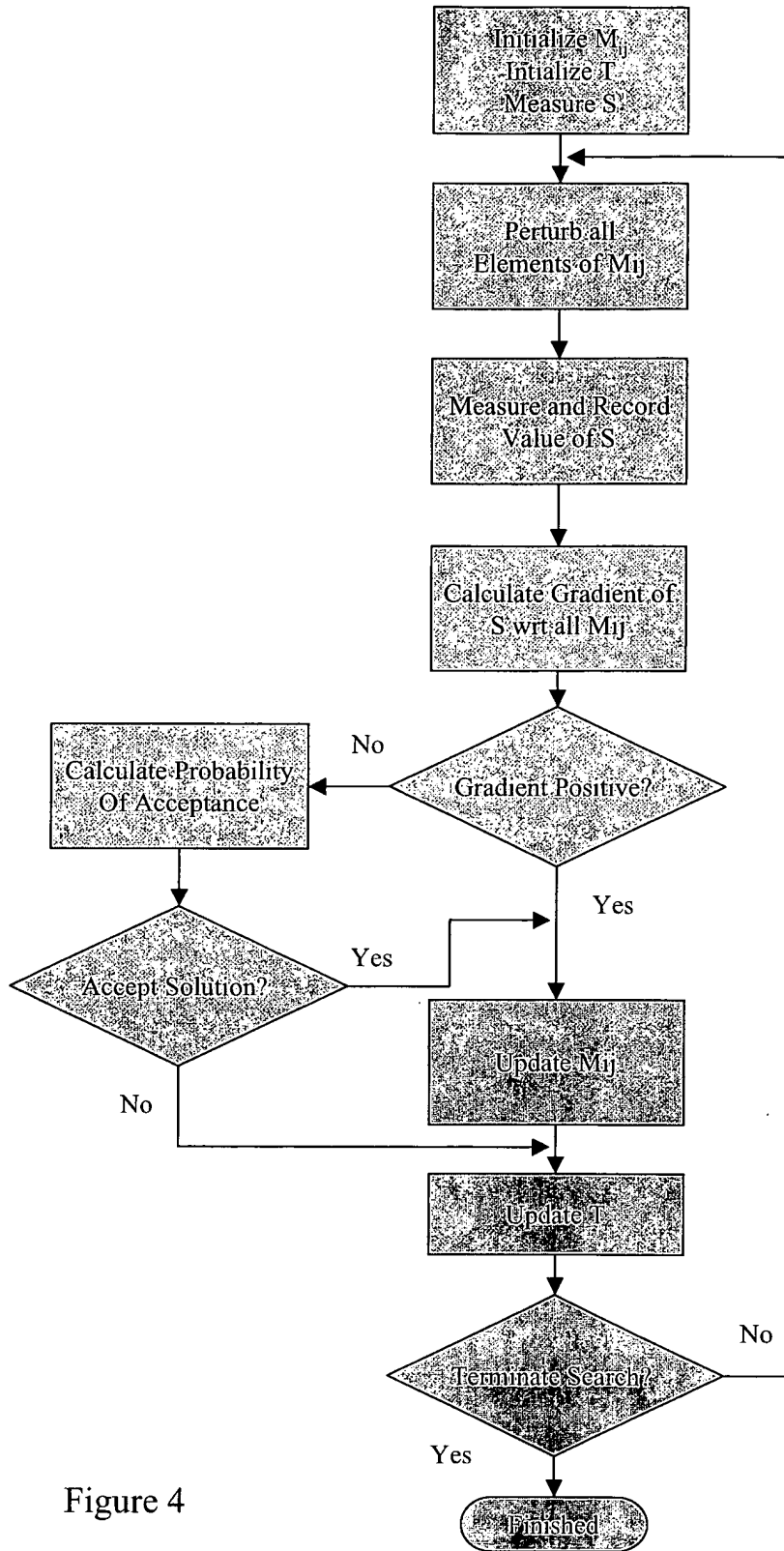


Figure 4

FIG. 85D

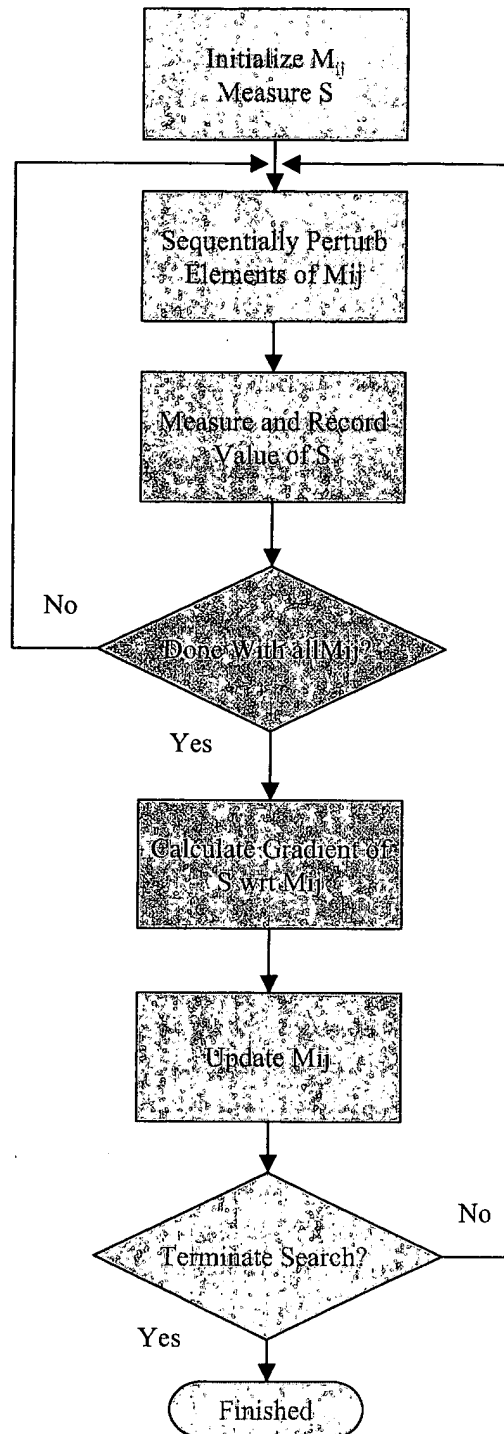


FIG 6A

SIM CONTROL  
Signal Generation  
Algorithm

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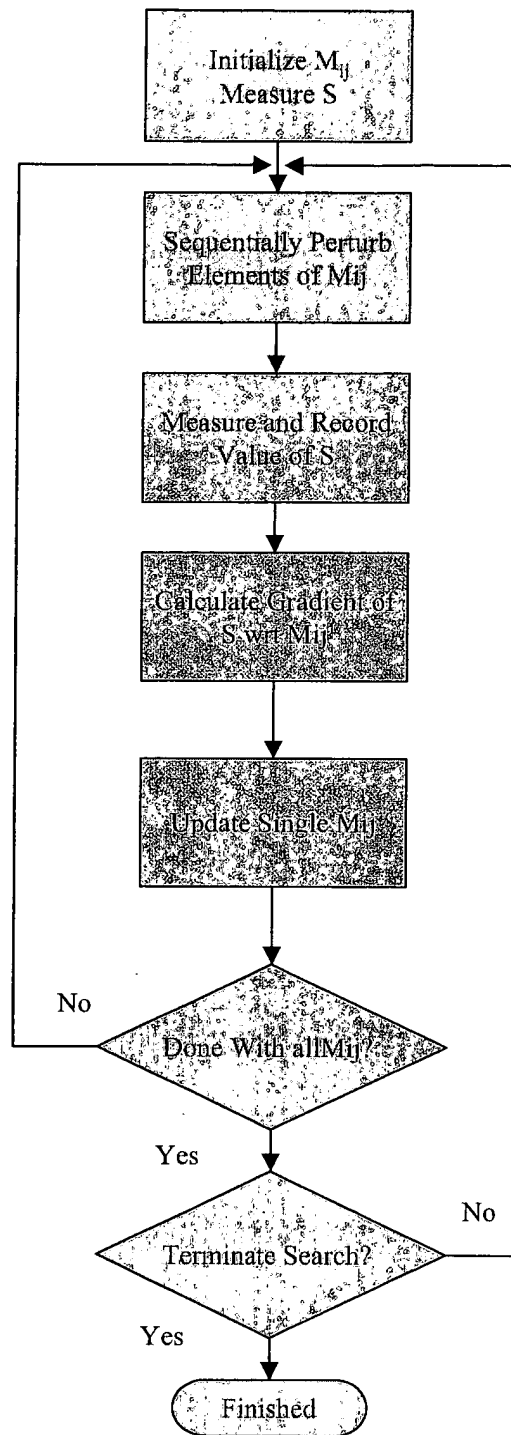


FIG. 6B

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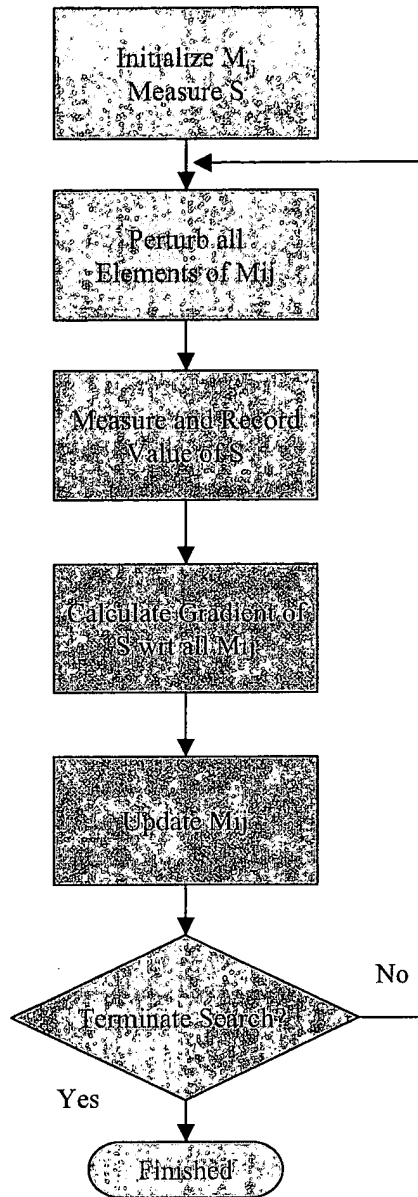


FIG. 6C

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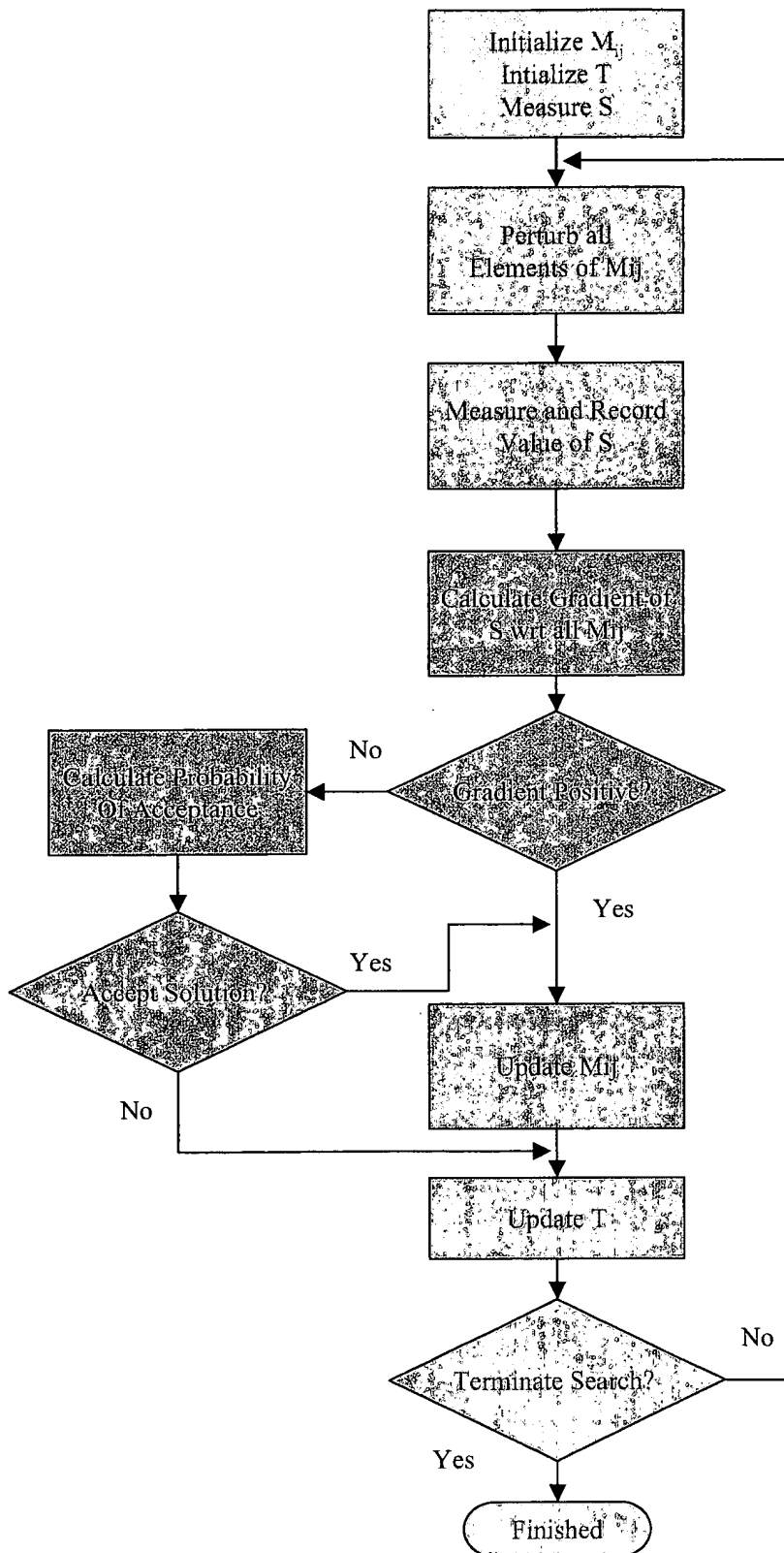


FIG. 6D

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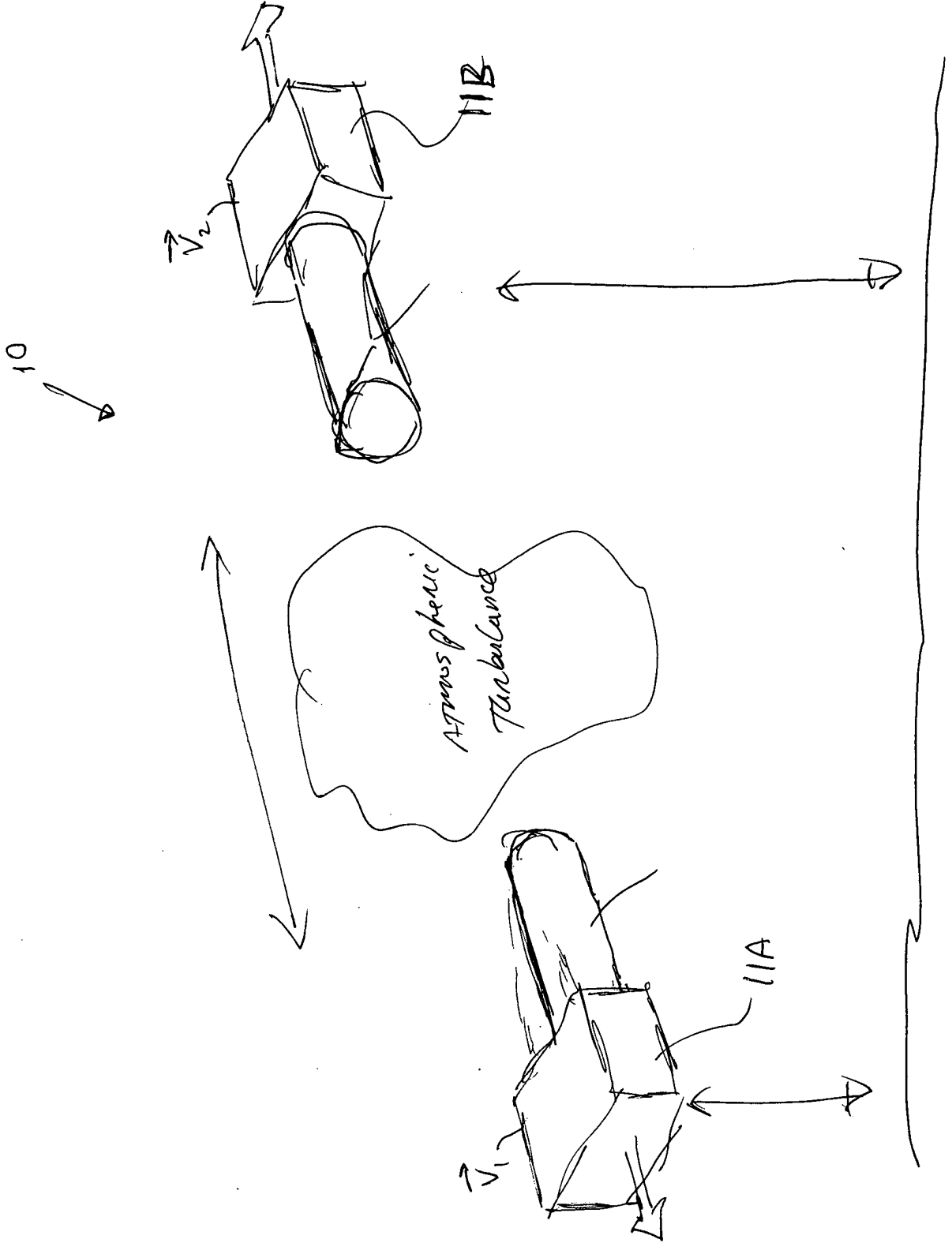
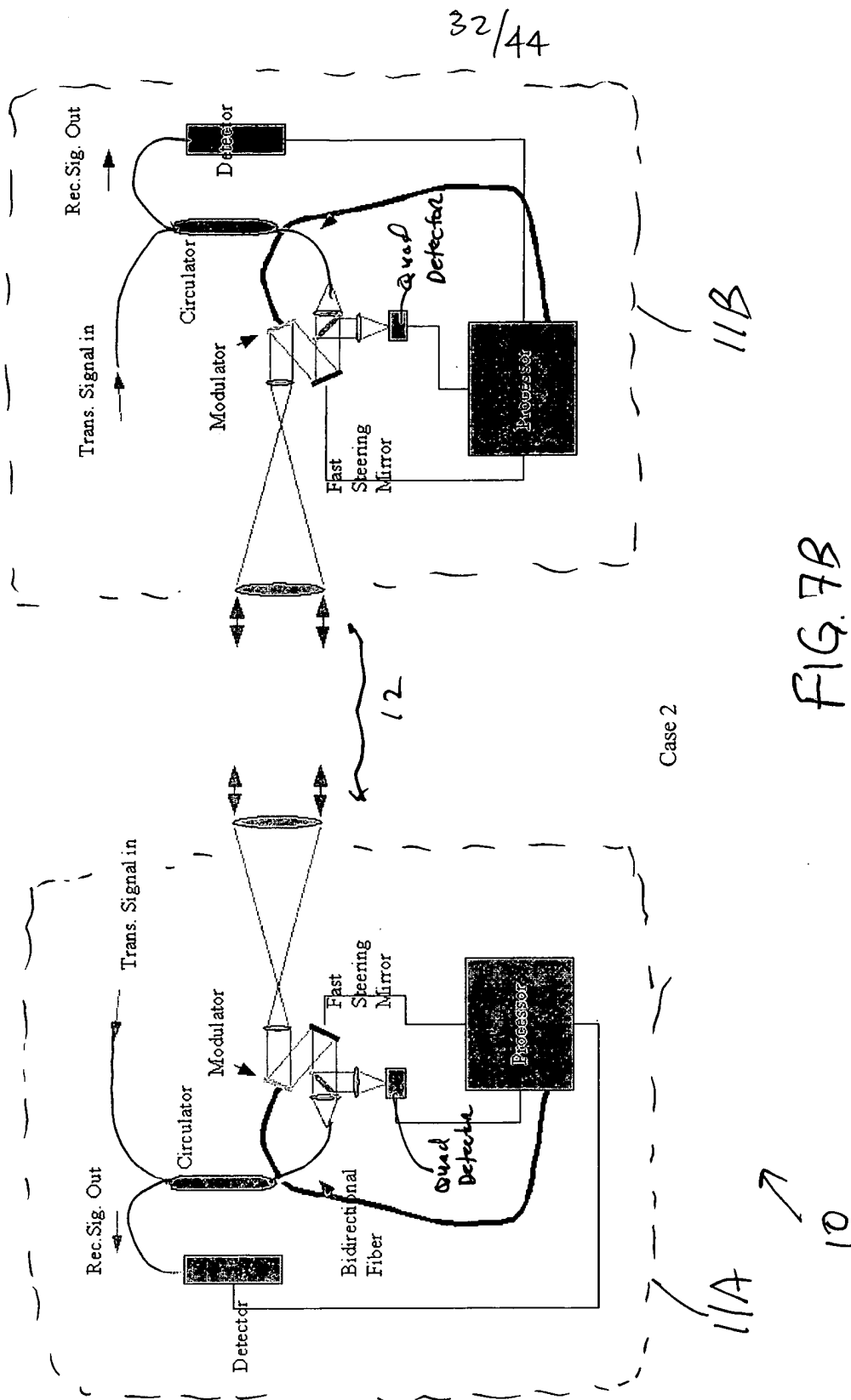
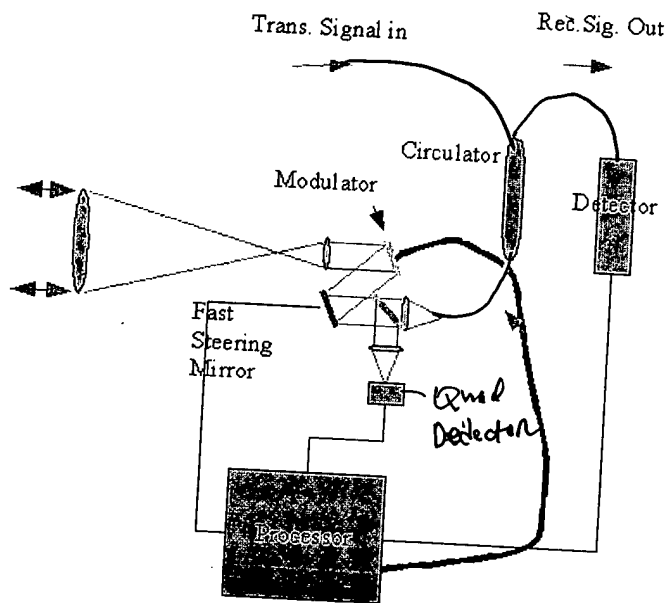


FIG. 7A



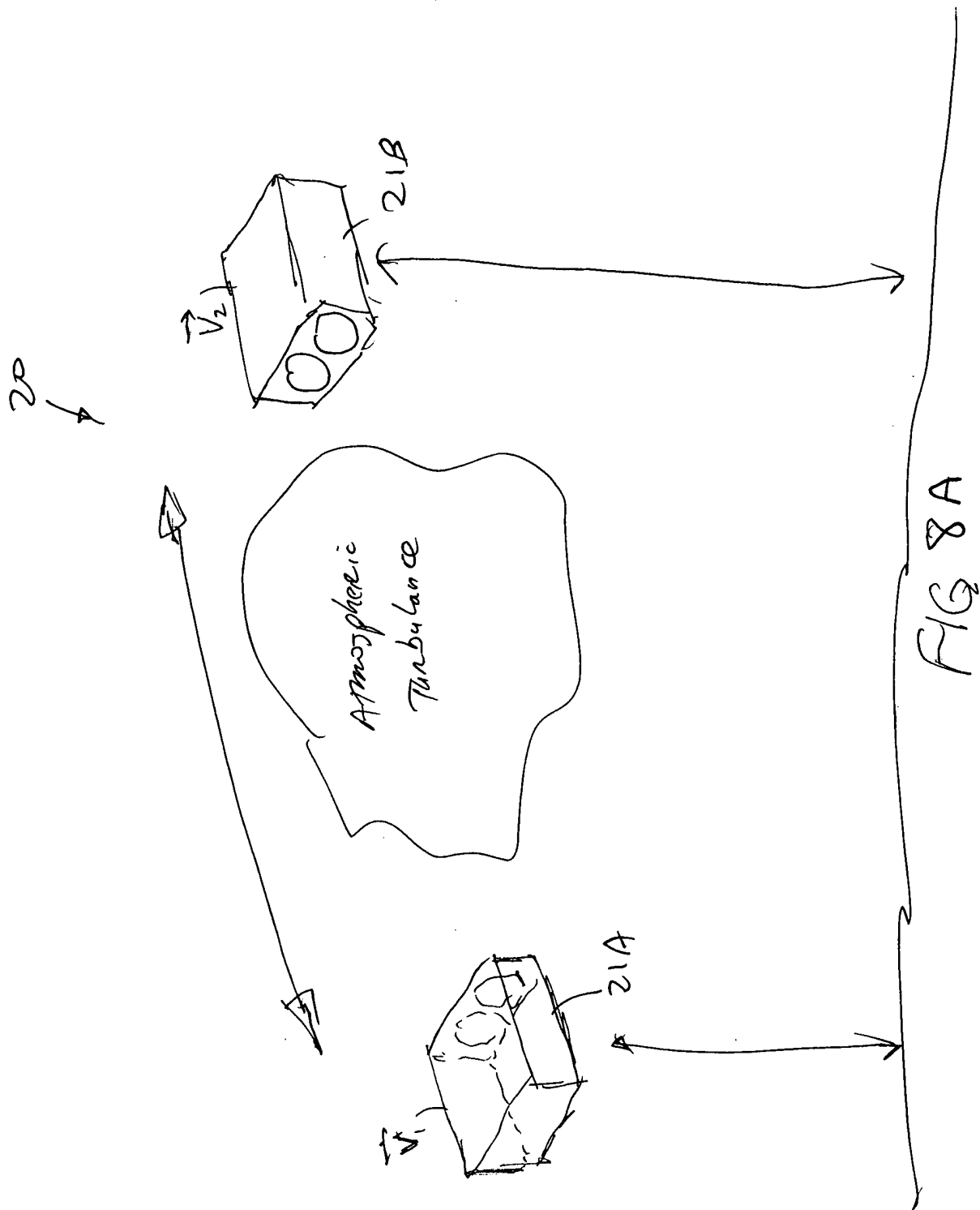


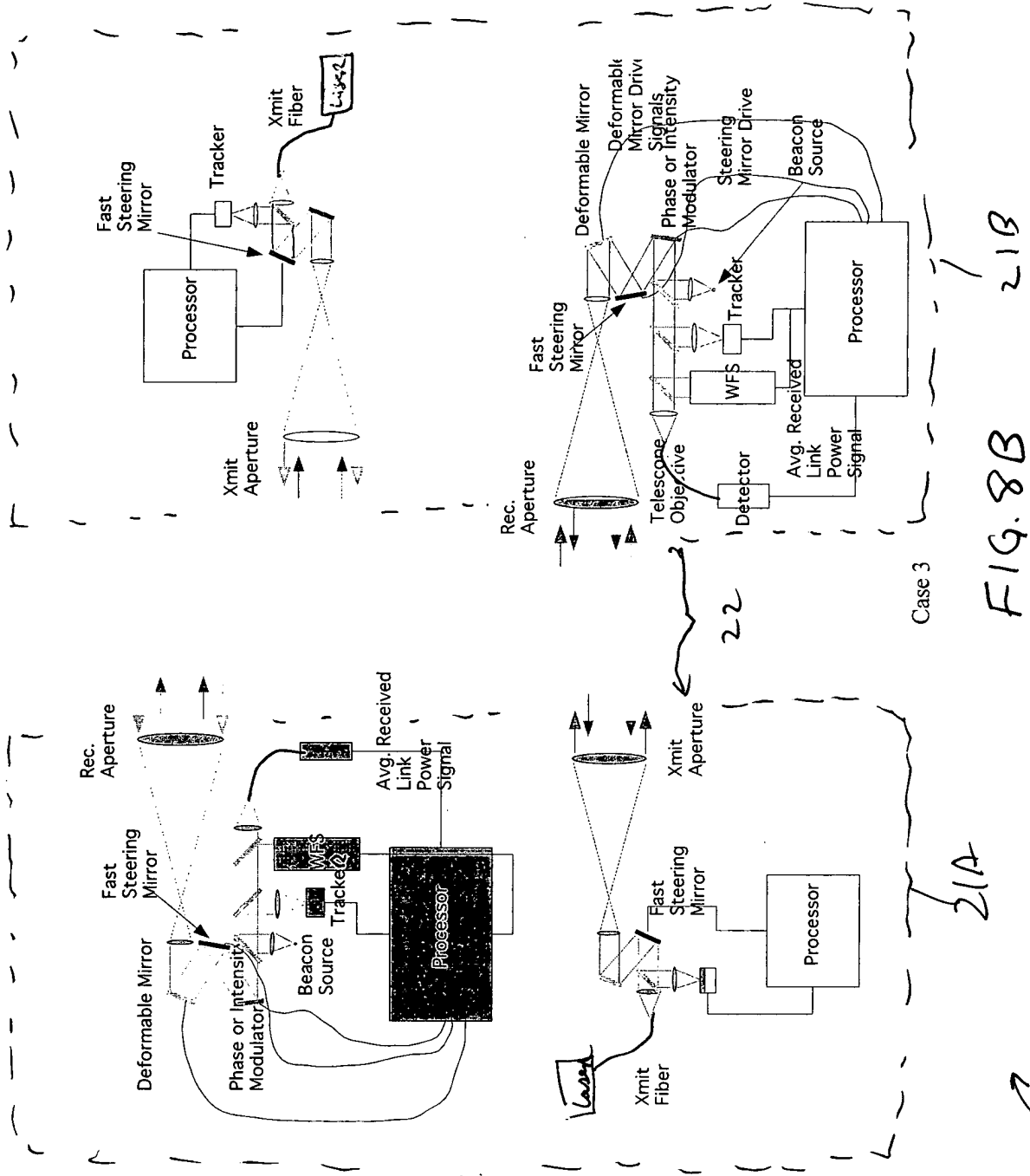
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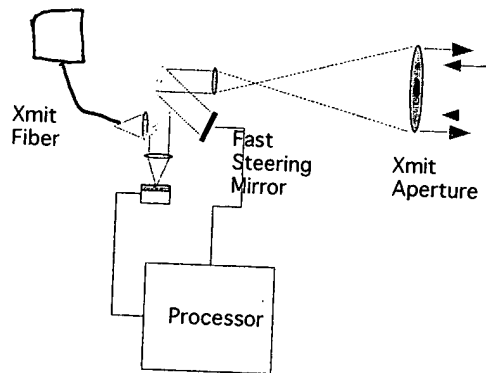
← U/A,  
NB.

AG.7C



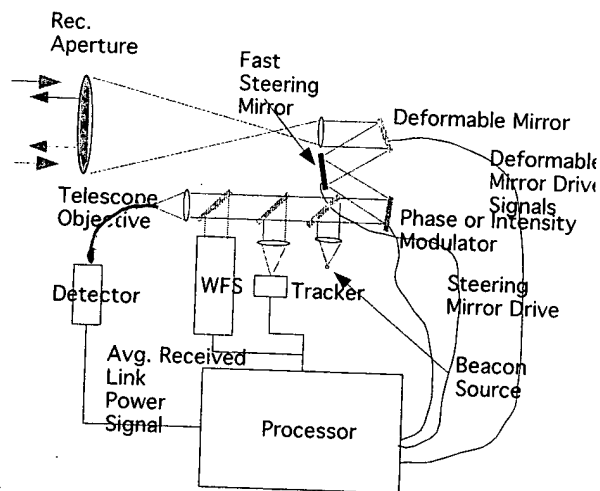


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← 23

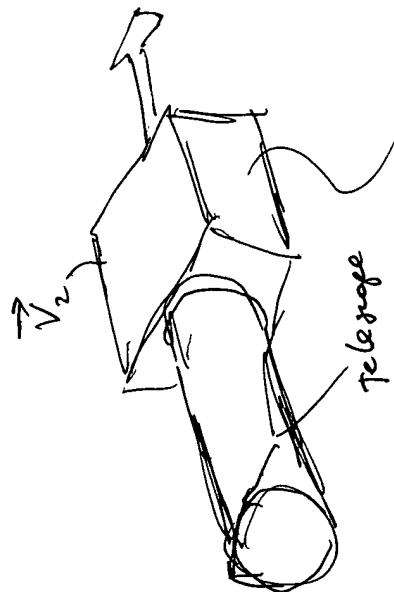
FIG. 8C



← 24

FIG. 8D

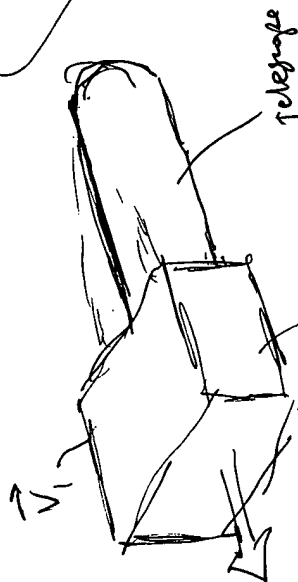
$\beta_0$



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31A

telescope

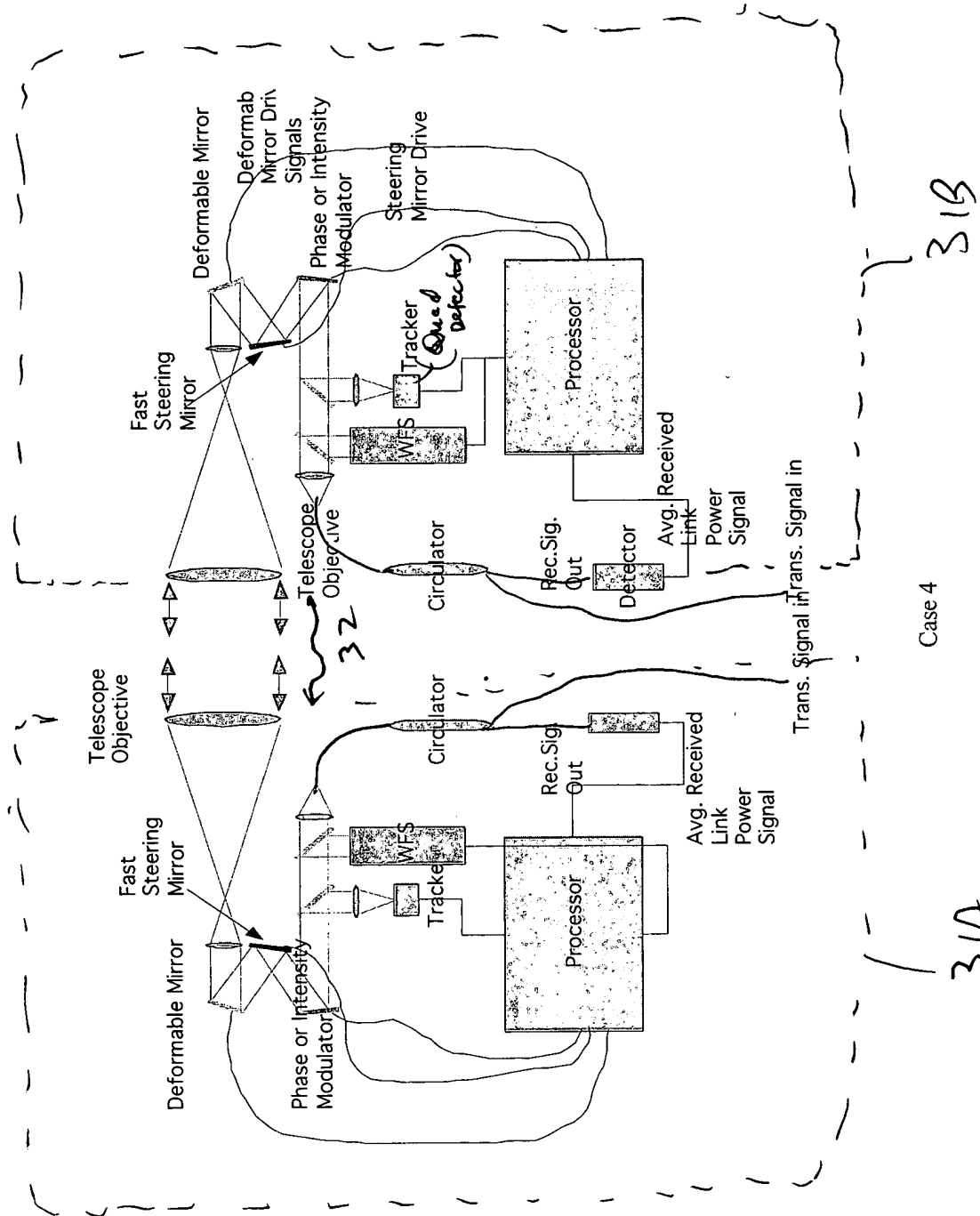


31B

telescope

FIG. 9A

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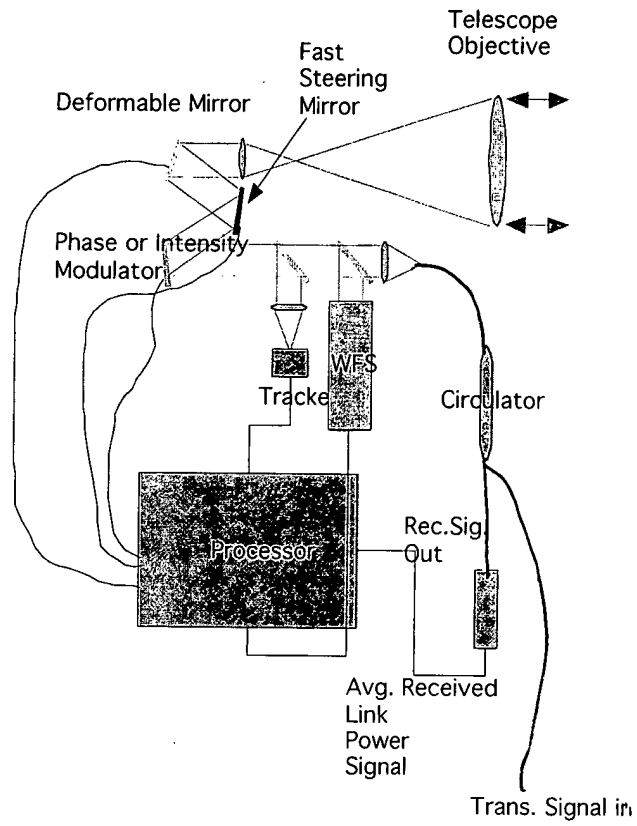


Case 4

FIG. 9B

"Retro-Reflective"

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← 31A,  
31B

FIG. 9C



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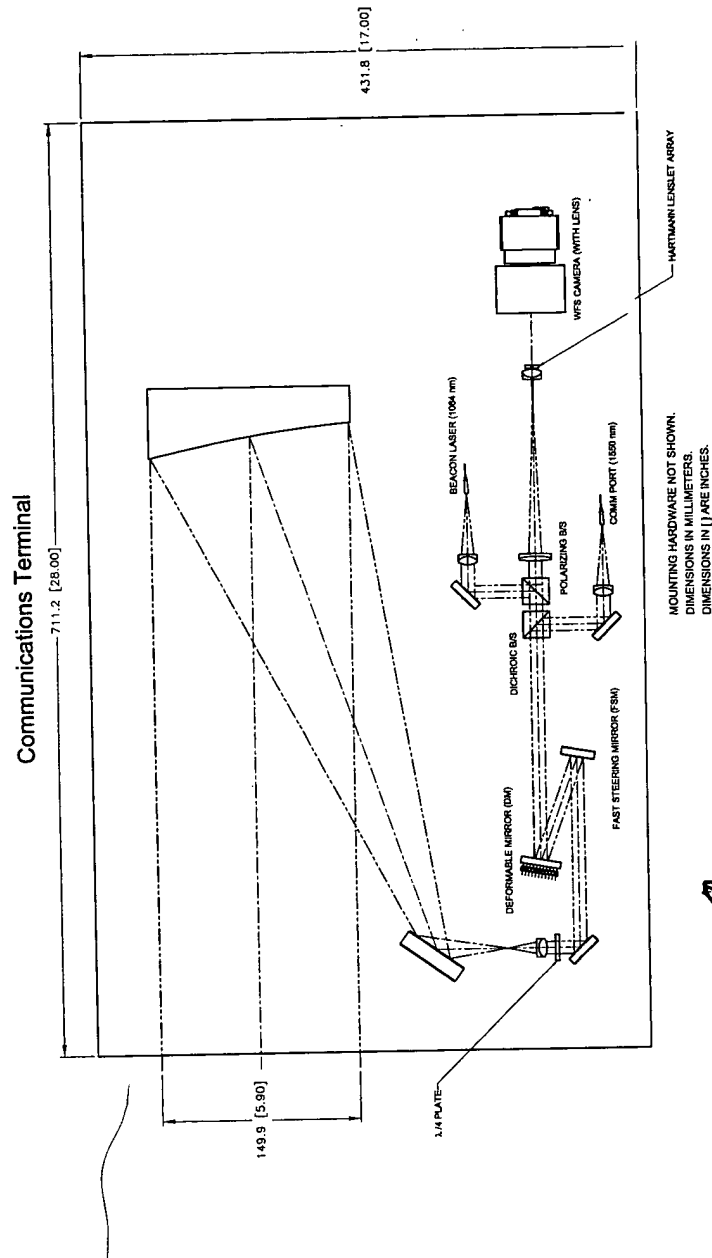
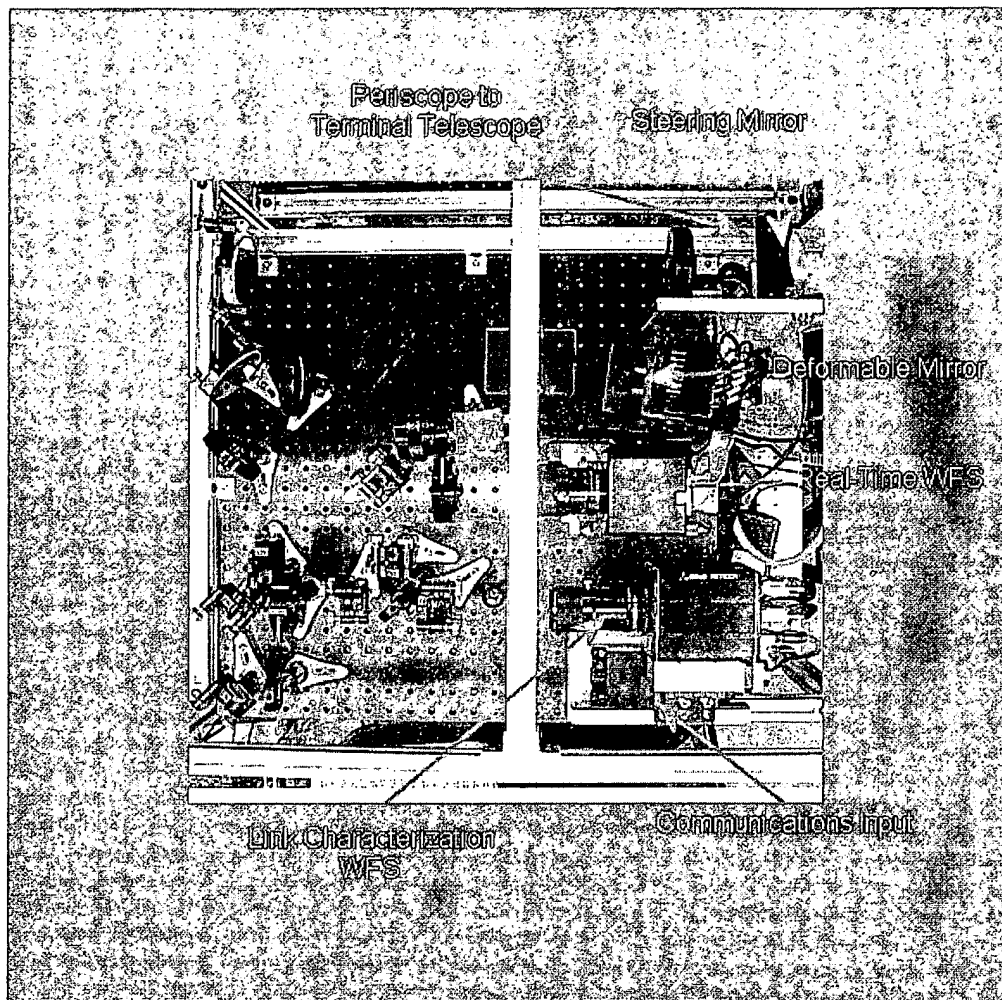


FIG 9D

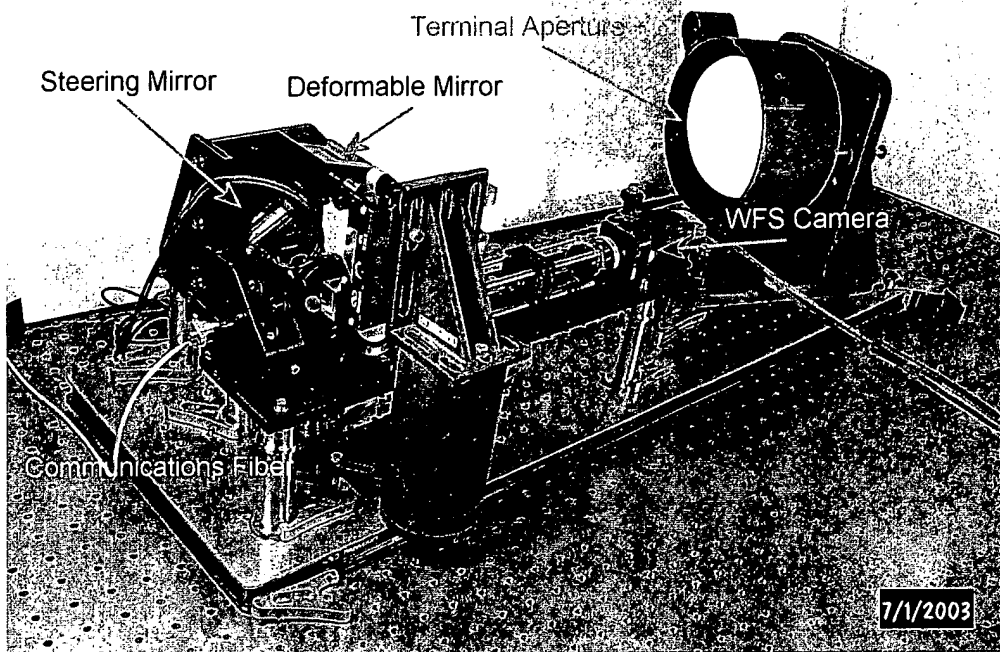
31A, 31B



31A, 31B

FIG. 9E

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← 31A,  
31B

Compact laser communications terminal with 15cm aperture. This terminal has both a fast steering mirror and deformable mirror for atmospheric compensation. This terminal is set up as either a transmitter or receiver, with a separate fiber port for a tracking and AO beacon laser source (hidden by the DM mount).

These are both laser comm. terminals with traditional adaptive optics. A terminal with fade prevention would look similar. Note that these use reflecting telescopes (the one on the top has an 8 inch Schmidt Cassegrain telescope on the other side of the optical breadboard. In the schematic drawings a refracting telescope is shown for simplicity. Either can be used in practice.

FIG. 9F

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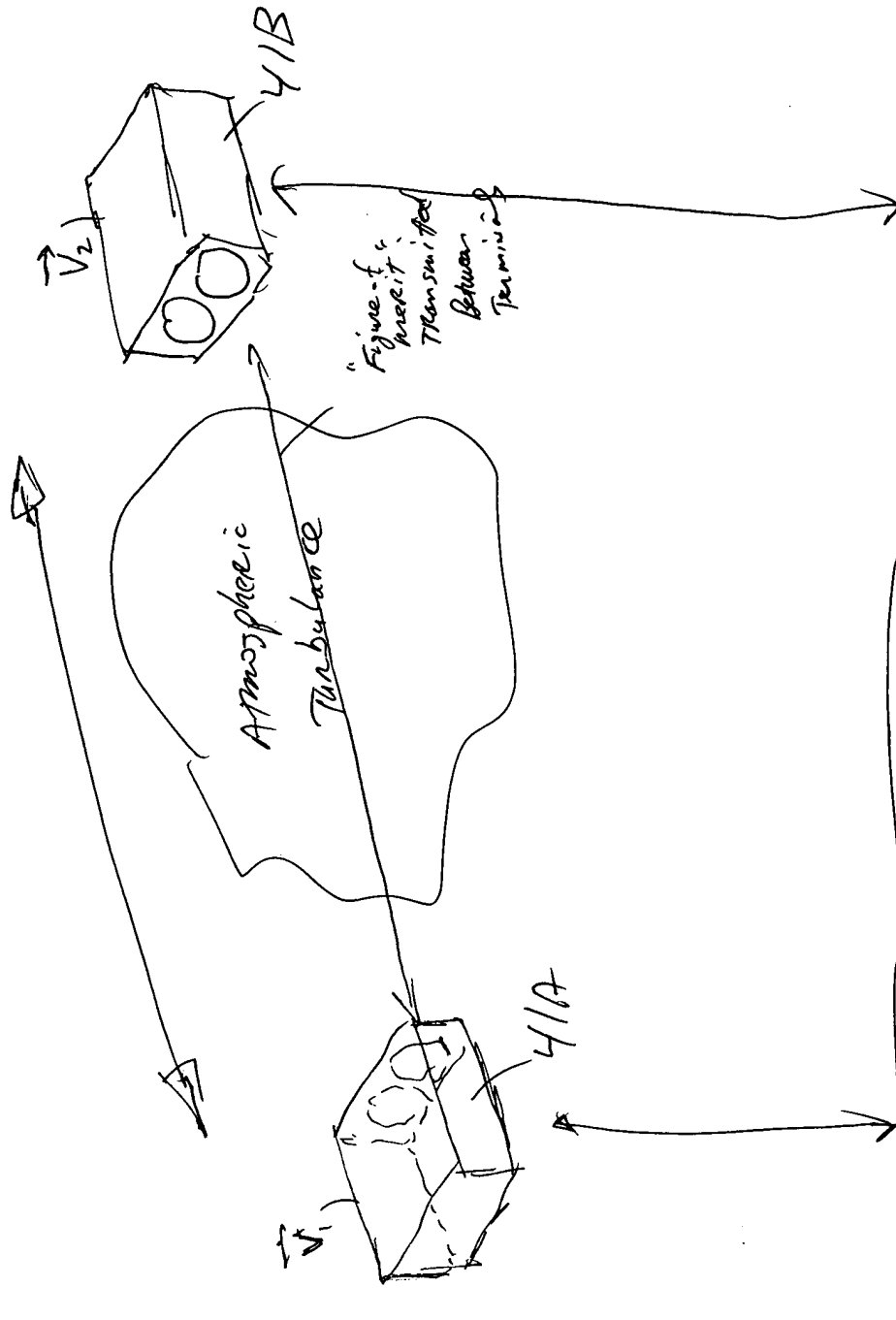


FIG 10A

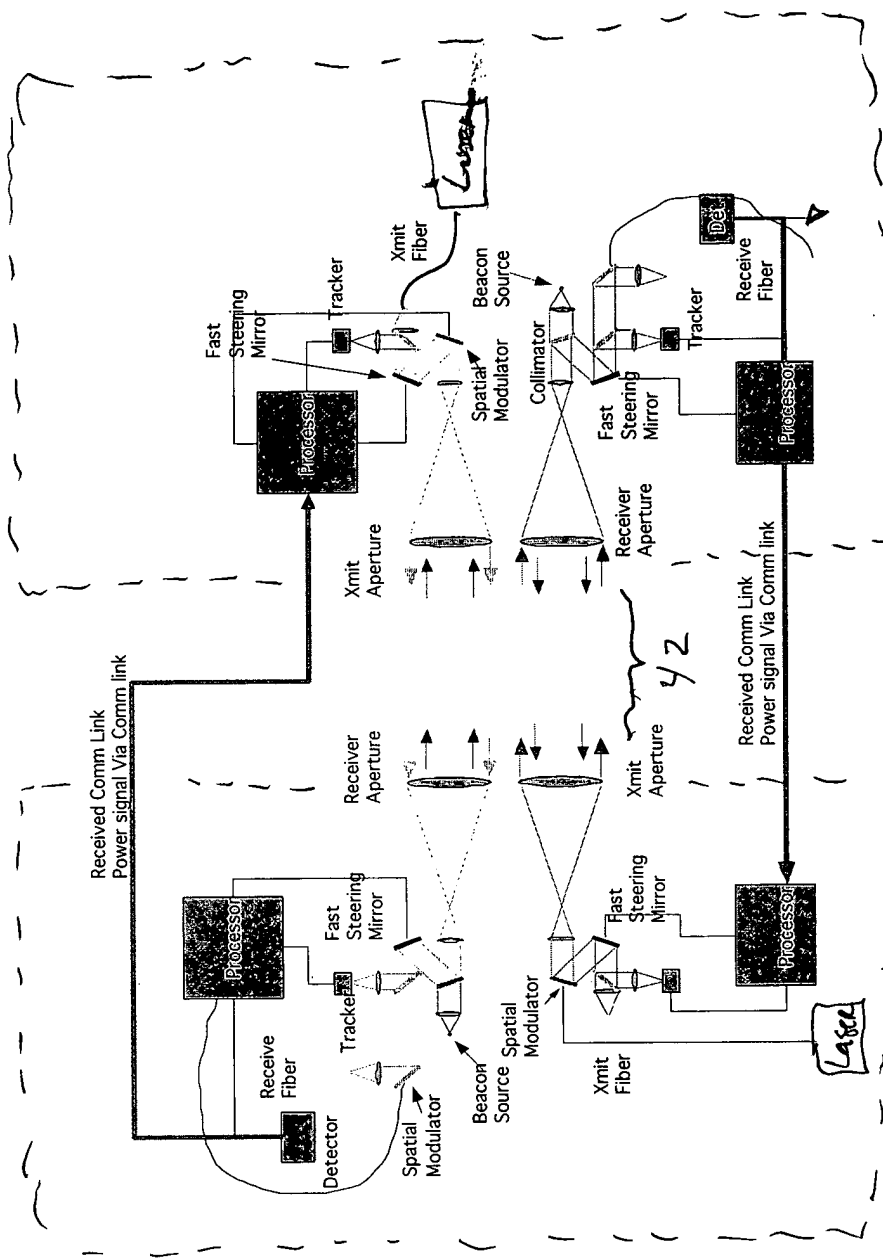


FIG 10B

41A

40